

# NEURON

SPRING 2018

West Virginia's Journal of Science and Research

## Afrin Naz

Computer science professor  
brings STEM to girls and  
educators in rural West Virginia

Marshall Medicine receives  
multi-million dollar grant

WVU's Jutla earns prestigious  
career award

West Liberty's Horzempa  
wins Professor of the Year





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**SPRING 2018**

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### ABOUT

West Virginia Science & Research, a division of the West Virginia Higher Education Policy Commission, provides strategic leadership for the development of competitive academic research opportunities in science, technology, engineering and mathematics. The office directs the National Science Foundation's Established Program to Stimulate Competitive Research (EPSCoR) in West Virginia, coordinates scientific research grants to academic institutions from federal and state agencies, and conducts outreach activities to broaden the public's understanding of science.

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*Afrin Naz prepares for class at West Virginia University Institute of Technology*

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# WVU Tech instructor focuses outreach on encouraging girls and educators from rural areas to pursue STEM and computer science education

Written by **Angela Sundstrom**  
Photos by **Chris Jackson Photography**

Afrin Naz wants to see more diversity in her computer science classes. An associate professor in the Leonard C. Nelson College of Engineering and Sciences at West Virginia University Institute of Technology (WVU Tech) since 2011, Naz spends considerable time on outreach.

“I am female. I am Asian. I am Muslim. I represent minorities,” Naz said. “I grew up learning the challenges facing minorities. I also came from a place where opportunities are rare.”

A Bangladesh native who arrived in America at the height of the dot-com bubble, Naz credits her parents for cultivating interest in both science and teaching.

According to the American Society of Engineering Education, a majority of aspiring science, technology, engineering and mathematics (STEM) students have parents in related fields. Naz was no different with her grandfather a physician and her father a scientist. Naz’s mother, a chemistry degree-holding president of a women-only university in Bangladesh named “Eden Mahila Mahabiddalaya,” was her source of inspiration.

“I was very lucky as my mom was a pioneer back home. She was my mentor. She guided me all the way through. She always told me that, ‘As a girl, you are no less than anyone else.’ Unfortunately, many female students in rural West Virginia – and all over the world – are not as lucky as I was. The ones who are lucky, I think it is our goal to help those who are not.”

According to the Office of the Chief Economist (OCE) in the U.S. Department of Commerce, women filled 47 percent of all U.S. jobs but held only 24 percent of STEM jobs in 2017. The OCE also says women make up a disproportionately low share of degree holders in all STEM fields, particularly engineering. Women with STEM degrees are less likely than their male counterparts to work in a STEM occupation as many choose education

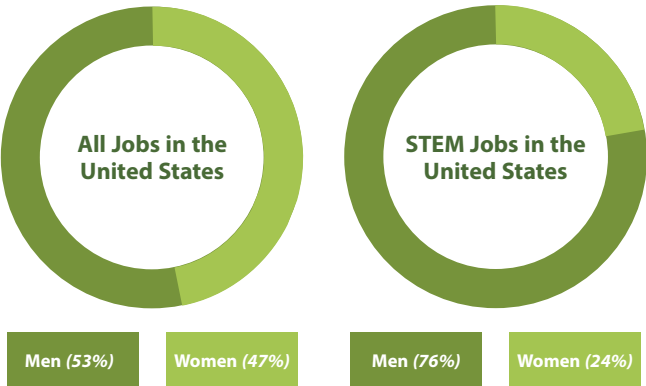
or healthcare. “The numbers in computer science are even worse,” Naz said. “Less than 10 percent. I was always the only girl in my class.”

In 2014, with Toyota’s support, Naz founded Girls Academy, a free week-long STEM program for high school girls in West Virginia held on WVU Tech’s Beckley campus. The program’s goal is to teach girls, preferably freshman and sophomores from low income families, courses in engineering, mathematics and science. These include biology, chemistry, nursing, computer science and pharmacy, as well as civil, chemical, computer, electrical and mechanical engineering.

“The goal for Girls Academy is finding the girls that never thought about STEM, maybe their family never thought about STEM, and showing them how it can change their lives.”

Attendees are also taught the importance of professional skills such as writing, presentation design, public speaking and teamwork. Current female WVU Tech students are assigned as mentors.

“During the whole six days, this high school girl is walking with this current WVU Tech female student who is also first generation, who is also from West Virginia, who is just a few years ahead of her. She can relate.”



Office of the Chief Economist at the U.S. Department of Commerce, 2017

“The ones who are lucky, I think it is our goal to help those who are not.”  
- Afrin Naz



Afrin Naz and several students demonstrate robotics.

Photo: Chris Jackson Photography



Improving the racial diversity of students is also a goal. Naz began working with local minority group African American Collaborative in 2015. By 2017, the program was 51 percent African American.

With challenges still ahead, Naz was eager to branch out further. This led her to the West Virginia NASA Space Grant Consortium where like-minded female leaders proposed a new initiative: EMPOWERS, Establishing Mentoring Pipeline of Women through Education and Research in STEM.

EMPOWERS has only existed for a few months, but already secured several mini-grants and is prepared to launch two new programs: Ambassadors, sponsored by the American Association of University Women and NASA, and Girls Interested in Robotic Lego Software (GIRLS), sponsored by the National Center for Women and Information Technology.

The need for quality professional development came into focus. Since 2015, the West Virginia Higher Education Policy Commission's Division of Academic Affairs has awarded grant money to three of Naz's professional development workshops for middle school and high school math and science teachers. She has also worked with Google since 2013 to provide professional development in computer science, an evolving field that requires continued learning. Many secondary educators lack the skills and resources to properly teach current computer science courses.

"I have been working at the grass-roots level directly with K-12 teachers and students for five years. With continuous efforts, I have gradually observed positive outcomes. For instance, our university students, with our assistance,

are currently mentoring Raleigh County middle school students on a weekly basis. Fayette County middle school teachers are considering developing robotics clubs. Offering professional development is a vital solution."

Two specific needs were identified: ready-made material for teachers and yearlong, on-site and online support. The on-site support comes from WVU Tech students.

Naz also sees room for improvement in the popular STEM pipeline metaphor where mandatory computer science is emphasized in K-12 schools rather than only high school and college. She also believes research should be an integral part.

Throughout her endeavors, Naz has appreciated the support of her institution in helping her touch lives.

"WVU Tech is a win-win situation for me. I have smaller classes to work very closely with my students. However, for my research, I have all the facilities of a big university from my main campus in Morgantown." She is also thankful to her husband and two children for their support.

With the U.S. Bureau of Labor Statistics reporting 93 out of 100 STEM occupations have wages significantly above the national average wage for all occupations of \$48,320, the future is bright for these aspiring students.

"STEM is fun, but we have to show it to them."

Below: Afrin Naz teaches a class of computer science students at WVU Tech's Beckley campus.

Photo: Chris Jackson Photography



# Marshall School of Medicine receives multi-million dollar grant to research obesity and related disease

By Leah Payne

Uma Sundaram, M.D., vice dean for research at the Marshall University Joan C. Edwards School of Medicine and a board-certified gastroenterologist, has been awarded a five-year, \$10.78 million grant from the National Institutes of Health to investigate obesity and obesity-related conditions.

"Marshall University Joan C. Edwards School of Medicine continues its outstanding work to improve the health and well-being of West Virginians," said Marshall University President Jerome A. "Jerry" Gilbert. "This federal funding underscores the importance of the work being done here on obesity and its related disorders. I want to commend Dr. Uma Sundaram, the grant's principal investigator, and his team for their unwavering commitment to investigating issues that affect the citizens of our region in particular, and those across the country."



SUNDARAM

This is the first time in nearly 15 years that Marshall's medical school has received a prestigious Centers of Biomedical Research Excellence (COBRE) grant and is the largest programmatic award in the school's history. The federal funding is designed to help strengthen an institution's biomedical research infrastructure.

"I am incredibly proud of our wonderful group of senior researchers led by Uma Sundaram, Gary Rankin, Zijian Xie and others who have obtained this grant to ensure the professional development of our talented junior investigators," said Joseph I. Shapiro, M.D., dean of the school of medicine. "Such funding is essential to continue our mission here at Marshall."

Sundaram is a busy researcher whose previous work included studies in hepatitis C, inflammatory bowel disease (IBD), peptic ulcer disease and Barrett's esophagus, among other areas. His current research focusing on IBD, colon cancer and obesity is funded by grants from the National Institutes of Health, the Veteran's Administration and the West Virginia Higher Education Policy Commission. He will serve as the principal investigator and program director of the COBRE-funded Appalachian Center for Cellular transport in Obesity-Related Disorders (ACCORD) at the medical school.

"Many of the diseases we see in West Virginia and central Appalachia have their roots in widespread obesity that's prevalent in the region," Sundaram said. "This funding is important because it supports obesity research by young investigators at Marshall, thus building a strong foundation to support research which will have a significant impact on the future health of those in our state and region."

U.S. Rep. Evan Jenkins, who announced first-year funding of the project, commended Marshall researchers for their work.

Sundaram's team at Marshall includes Drs. Subha Arthur, Travis Salisbury, Maria Serrat, Yanling Yan, Isabel Perez, Elaine Hardman, Todd Gress, Todd Green, Richard Egleton, James Denvir, Gary Rankin, Zijian Xie, Jung Han Kim, Don Primerano, Sutodeim Akpanudo and Mike Norton.

The project is awarded by the National Institute of General Medical Sciences 1P20GM121299-01A1.

Photo: Marshall University Communications



**“The computational infrastructure developed through this research will be made available to a wide array of students who have interest in public health, climate modeling and hydroclimatology.”**

**- Antar Jutla**

Jutla

## Jutla earns prestigious career award from National Science Foundation

From **West Virginia University's Statler College Relations Office**

Antar Jutla, assistant professor of civil and environmental engineering at West Virginia University, has earned a prestigious CAREER award from the National Science Foundation for his research on how extreme events and enhanced climatic variability impact the emergence of water-borne pathogens that cause infection in humans. The award comes with nearly \$500,000 in funding over a five-year period.

Yemen and Haiti are just two of a growing number of countries that are facing humanitarian crises due to escalations in cholera cases. In Yemen alone, the International Committee of the Red Cross announced that the number of suspected cholera cases in the war-torn

country had reached one million in less than nine months.

According to Jutla, there are several issues that have led to the rapid spread of this disease, which is 100 percent preventable and treatable.

“Aging and deteriorating civil infrastructure is the major road block to combat diseases such as cholera,” said Jutla. “A natural disaster usually destroys fragile infrastructure, which causes people to interact with water that is already contaminated with pathogens.”

Jutla and the members of his research team, which include WVU students at both the graduate and undergraduate levels, will analyze satellite data to create models that predict the distribution of pathogenic cholera bacteria. The goal is to determine potential new regions with elevated risk of disease outbreak where increases in climatic variability intersect with extreme natural events.

Photo: West Virginia University

“The research is intended to provide a quantitative baseline framework, potentially applicable on a global scale, to assess the occurrence and spread of pathogens in the environment and human population,” Jutla said. “This can aid policymakers, aid organizations and governmental health agencies in the preparation of disease mitigation strategies. The computational infrastructure developed through this research will be made available to a wide array of students who have interest in public health, climate modeling and hydroclimatology.”

“One of the biggest challenges that we are likely to face is from changes in frequency of Atlantic hurricanes,” Jutla continued. “Tools and algorithms developed in this project will aid in determining policies to develop resilient and robust civil infrastructure.”

Hema Siriwardane, department chair, said Jutla’s research covers topics like hydroclimate, environment, and human health.

“His research interests include remote sensing of hydrologic processes, food security, human nutrition and water governance, and he has developed a strong research program linking water resources and human health. His research work also has an international

component, which has brought visibility to our graduate program. This award will contribute to increasing the number of graduate students and improving the national and international visibility of the Department.”

Jutla earned his doctorate in civil and environmental engineering from Tufts University and master’s degrees in civil and geological engineering and soil and water engineering from the University of Saskatchewan and Punjab Agricultural University, respectively.

The NSF’s Faculty Early Career Development, or CAREER, program supports junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations. This is the eighth straight year that a member of the Statler College of Engineering and Mineral Resources faculty has been selected to receive this honor.

“Dr. Jutla is just the latest in what has become a long list of Statler College faculty to earn this prestigious award from the National Science Foundation,” said Gene Cilento, Glen H. Hiner Dean of the Statler College. “His work has the ability to affect countless numbers of people across the globe in life-saving ways.”

GEOLOGY

## Concord University key partner on National Science Foundation grant, hire widely-known volcanologist

By **Sarah Dalton**

Concord University, along with five partner institutions, has been awarded \$579,998 through the U.S. National Science Foundation’s EarthCube program which seeks to transform research in the earth sciences via publicly-accessible databases and online tools.

The funded project is titled “THROUGHPUT: Standards and Services for Community Curated Repositories.” Other partner institutions include Columbia University, the Consortium for Ocean Leadership, Northern Arizona University, the University of Wisconsin and the University of Minnesota.

Dr. Stephen Kuehn, associate professor of geology and director of the Electron Microprobe Laboratory, serves as Concord’s lead investigator. A major contribution to the project is information on explosive eruptions of Cascade Range volcanoes and of other volcanoes from

around the world that has been collected by Dr. Kuehn and numerous Concord geology students over the last seven years. Data collected by researchers at other institutions will also be included.

Concord recently hired Dr. Janine Krippner to work on the THROUGHPUT project. Originally from New Zealand, she completed her doctoral degree at the University of Pittsburgh, where she studied pyroclastic flows from Shiveluch volcano in Kamchatka and from Mount St. Helens in Washington State. She actively engages in volcano outreach on social media and has attracted more than 11 thousand followers on Twitter. She has also been interviewed by both print and broadcast media including the BBC News, CNN, Discovery Channel, NPR, The Wall Street Journal, The New York Times, National Geographic and other media outlets around the world.



# West Liberty University's Joseph Horzempa Wins West Virginia Professor of the Year

By **Maureen Zambito**

The Faculty Merit Foundation announced West Liberty University (WLU) Associate Professor Joseph Horzempa, Ph.D., as the winner of its 2017 West Virginia Professor of the Year award. The Foundation presented the award on Thursday, April 12, during a banquet held in the Great Hall of the Culture Center in Charleston.

Horzempa is an associate professor of biology and the program director of West Liberty University's newest graduate degree program, the M.A./M.S. in Biology.

Since joining the WLU faculty in 2011, Horzempa has received over \$2.2 million in grants to support the activities of his lab. He and his students continue his work on developing new antibiotics and vaccines as they research the biology of the bacterium *Francisella tularensis*. He has been researching this bacterium since he was a postdoctoral fellow at the University of Pittsburgh School of Medicine.

Horzempa's work has been published in a wide variety of scholarly and scientific journals, including the International Journal of Antimicrobial Agents, Journal of Plant Pathology & Microbiology and American Journal of Virology. A lifetime member of the West Virginia Academy of Science, he is editor-in-chief of its open access, online, peer-reviewed scientific journal, Proceedings of the West Virginia Academy of Science.

Horzempa has twice been celebrated as West Liberty University's Professor of the Year, in 2015 and 2016; 2017 marks the second consecutive year he was named a West Virginia Professor of the Year finalist.

A native of Monaca, Pennsylvania, Horzempa earned his B.S. and M.S. from California University of Pennsylvania in 2000 and 2002 followed by his Ph.D. from Duquesne University in 2006 and postdoctoral at the University of Pittsburgh School of Medicine from 2006-2011.

West Liberty University has been singled out for this honor in the past when Zachary Loughman, also a professor in the College of Sciences, was named the state's 2014 Professor of the Year.



Above: Joseph Horzempa displays his West Virginia Professor of the Year award in a laboratory at West Liberty University.

## FACULTY MERIT FOUNDATION

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Recognizes innovation  
and creativity

Photo: West Liberty University



# Marshall students and staff help in liberation of child trafficking victims

By **Jean Hardiman**

A group of Marshall University's Digital Forensics and Information Assurance students, faculty and staff have assisted in the liberation of nearly 40 child trafficking victims and the arrest of 10 suspected traffickers.

They did so through a partnership with the nonprofit group Operation Underground Railroad (O.U.R.). The effort took place in recent months and involved sex trafficking in Latin America, the Caribbean and Southeast Asia.

John Sammons, director of Marshall's Digital Forensics and Information Assurance program in the College of Science, heard about O.U.R. on a podcast and thought the students in Marshall's Open Source Intelligence Exchange (OSIX) program could help. The OSIX program uses selected and vetted college students to provide open source intelligence collection and analysis for law enforcement and other clients.

Sammons approached Matt Osborne, senior vice president of Rescue and Recovery of O.U.R., whom he had met at a conference in Dallas, and Marshall students started work on this project in October 2017. O.U.R. operatives used intelligence gathered by Marshall students to work undercover investigations on the other side of the world.

Students were thankful to be part of the effort.

"The opportunity to gather intelligence for a real-world operation has been the most rewarding experience throughout my college career," said student Emily Hudson.

"Though this experience is different from other classes, this is something that I truly want to do," said student Stacy Cossin. "This experience has been truly rewarding because as a group we were able to improve the quality of people's lives."

Operation Underground Railroad is a registered 501(c)3 organization. Bringing together former CIA, Navy SEALs, and Special Ops operatives, O.U.R. partners with local law enforcement agencies around the world to save children from human trafficking.

"These Marshall University students are experts in scraping the web and leveraging online social media accounts to help O.U.R.'s law enforcement partners advance their child sexual exploitation cases," Osborne said. "Currently, O.U.R. operatives are using intelligence gathered by Marshall students to work undercover investigations in Thailand and Ecuador. We look forward to a continued partnership with Marshall throughout 2018 and beyond."

Above: Marshall University's OSIX team includes, from left, Cole Linder, Robert Dean, Shannon Faulkner, Whitney McAtee, Moya Dixon, Emily Hudson, Tiffany Hussell, Scott Ballengee, and Blake Lawrence. Not pictured: Stacy Cossin and Madline Flanagan.

Photo: Marshall University Communications





Lima



Turton

## Turton, Lima win inaugural R&D grant from Aveva

From **West Virginia University's Statler College Relations Office**

West Virginia University (WVU) is one of only two universities worldwide selected to receive a research and development program award from AVEVA, a leader in engineering and industrial software. The first-of-its-kind award will be used to focus on the research and development of next generation engineering design and simulation software.

The WVU team, led by Richard Turton, WVU Bolton Professor, Department of Chemical and Biomedical Engineering, and Fernando Lima, assistant professor of chemical and biomedical engineering, will use AVEVA's Unified Simulation Platform or SimCentral platform, a process simulation tool for designing and operating power plants.

"SimCentral is a new generation simulation platform

that piggybacks on some of the work we have been doing at the AVESTAR Center," Turton said. "This new platform allows for the simultaneous development of steady state, dynamic and fluid flow models, a feature that is currently lacking in other platforms. The platform is quite transparent and allows users to develop a wide variety of customized models within a simulation platform."

The research team will focus on developing membrane separation models that can be applied to a variety of chemical processes, such as oxygen separation from air, alternative natural gas utilization and carbon capture from coal-fired power plants. These models will eventually be disseminated to both academic and nonacademic users of the software. They will also develop complete operator training simulators for teaching purposes in the academic community.

AVEVA chose SimCentral as the targeted product for its first University R&D program because it provides an ideal

environment for academic institutions to develop additional functionality that can be demonstrated in the context of a practical simulator without the need to develop user interfaces, provide thermodynamic properties, or in some cases, without having to write computer code. This work will complement the operator training platform in the National Research Center for Coal and Energy's AVESTAR Center, a state-of-the-art training simulator that provides realistic, hands-on experience for operating clean energy systems in the smart grid era.

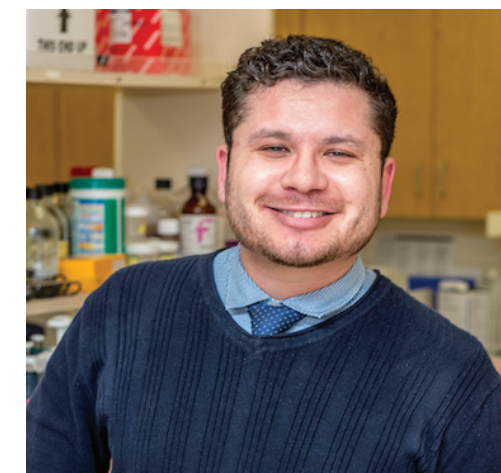
"Deepening our relationships with the academic community enables research and development collaboration in key areas of our business, including machine learning, analytics, product speed and statistical confidence, among other attributes," said Ravi Gopinath, chief operating office at AVEVA.

WVU and the Technical University in Dortmund, Germany, were selected from an international pool of 20 submissions that were reviewed by a panel of experts. Other finalists included UCLA; University of California, Berkeley; National University of Singapore; and University of Texas at Austin.

Photo: West Virginia University

Photo: West Virginia University

## West Virginia State student receives national leadership award



Lopez - Torres

By **Matt Browning**

West Virginia State University (WVSU) senior Edgar Lopez-Torres was one of 15 undergraduate students in the world to receive the 2018 Student Leadership Award from the American Chemical Society (ACS). The program recognizes emerging leaders in the ACS student chapter network and helps them prepare for leadership opportunities at volunteer organizations and in their professional career.

"Edgar is the first student from State to be selected for this honor," said Micheal Fultz, WVSU chemistry professor and advisor to the ACS chapter. "He is an incredible student with limitless potential."

It was Fultz who first suggested Lopez-Torres get involved with ACS. The University's active, award-winning student chapter is known for its community outreach efforts and bringing chemistry education and activities to elementary-age students throughout the region.

"Interacting with the kids is great," Lopez-Torres said. "The opportunity to get even one young person interested in science makes it all worthwhile."

As a recipient of the Student Leadership Award, Lopez-Torres was able to attend the 2018 ACS Leadership Institute, held in January in Dallas, where he was able to meet other award winners and ACS leaders and participate in a variety of leadership courses.

Lopez-Torres hopes to bring back what he learned at the conference to strengthen WVSU's ACS efforts, with a focus on recruiting additional members and retaining current ones. He is currently the group's vice president.

"I want to get our students more involved," he said. "We're growing, and I want to keep that momentum going."

**"The opportunity to get even one young person interested in science makes it all worthwhile."**

A California native, Lopez-Torres' family moved to West Virginia when he was a child. He graduated from Herbert Hoover High School before enrolling at State, where he first studied psychology before becoming a chemistry major. Slated to graduate in the spring of 2019, he is eyeing medical schools.

"There have been so many great opportunities provided to me thanks to being a student at West Virginia State University," he said. "The experiences I've had and people I've met and learned from would not have happened for me at a bigger school."





## WVU Cancer Institute participates in groundbreaking study on new cancer drug

By **Amy Johns**

The WVU Cancer Institute is one of several sites nationwide that participated in a groundbreaking clinical research study of a novel drug proven very effective in the treatment of pediatric and adult cancers that carry a specific genetic mutation.

Larotrectinib, developed by biopharmaceutical company Loxo Oncology, was tested in three clinical research studies at cancer centers nationwide. Patients ranged in age from four months to 76 years and had a total of 12 different tumor types, including common and rare cancers but all had the genetic mutation in the NTRK gene in common.

Seventy-five to 80 percent of the 55 adult and pediatric patients treated with larotrectinib experienced significant tumor reductions with only mild side effects, regardless of patients' ages and specific tumor types. One patient with *infantile fibrosarcoma* responded so well to the test drug that limb amputation surgery was no longer necessary as part of the child's treatment plan.

"This study demonstrated the principle of genomically targeted therapy and represents a possible paradigm change in treatment for these patients," Patrick Ma, M.D., principal investigator of the WVU Cancer Institute study, said. "Larotrectinib works by seeking out the NTRK cancer gene that is activated by a form of gene fusion in these

cancers and prevents its ability to promote cancer growth."

Patients enrolled in the study had TRK fusion cancers caused by NTRK gene mutations that were detected through molecular profiling, a technology that allows clinicians to determine the genomic make-up and origin of cancer and its specific drug responsiveness to inform cancer treatment.

"Importantly, TRK fusion cancers occur in less than one percent of cancers but can be found in more than 20 cancer types," Ma said. "Identifying these unique, genomically altered orphan cancers becomes crucially important with highly effective targeted therapy available that can make a real difference in treatment outcomes. With the help of comprehensive molecular profiling, we not only can identify and match patients to optimal therapies but can also better understand changes in tumor cells throughout treatment and offer patients more personalized therapy."

Ma is director of the Clinical Lung Cancer Program and co-leader of the Sara Crile Allen and James Frederick Allen Lung Cancer Program at the WVU Cancer Institute. He is co-author of the article "Efficacy of larotrectinib in TRK fusion-positive adult and pediatric cancers," which was published in the Feb. 22 issue of the *New England Journal of Medicine*.

Photo: West Virginia University

## WVSOM recognized by U.S. News for 20th year

By **Tiffany Wright**

The West Virginia School of Osteopathic Medicine (WVSOM) has again been recognized as one of the nation's top medical schools.

For the 20th consecutive year, WVSOM received recognition by the U.S. News & World Report "America's Best Graduate Schools" annual publication. This distinction solidifies WVSOM's reputation among all allopathic and osteopathic medical schools nationwide.

WVSOM is No. 4 in the percentage of graduates entering primary care specialties, based on 2015-2017 residency data. Specifically, 69.2 percent of WVSOM graduates entered primary care residencies.

"A main component of WVSOM's mission is to educate students as lifelong learners who will later serve in rural areas. Our mission really focuses on primary care, so to be recognized for two decades as a top medical school proves that WVSOM is delivering in its mission," said President Michael Adelman, D.O., J.D.

Credits: (Top two photos) Marshall University Communications; (Bottom photo) West Virginia University



Piaskowski



Roberts

## Marshall students to conduct summer research

From **Marshall University Communications**

Two Marshall University students recently received prestigious summer research opportunities.

Mary Piaskowski, a junior biological sciences major, received a Mayo Clinic Summer Research Fellowship to further study immunology.

Aaron Roberts, junior biochemistry major, won a DAAD-Research Internship in Science and Engineering (RISE) for study in Germany. He hopes to eventually complete a master's degree in immunology and then pharmacy school.



Elliott

## Air Force veteran wins Goldwater Scholarship

From **WVU Today**

Rodney Elliott dreamed of going to college and studying science but it was a dream deferred because of family finances. He joined the Air Force and, after a 20-year career, enrolled at West Virginia University. Now, he has won the most prestigious undergraduate

scholarship in the natural sciences, mathematics, and engineering - the Goldwater Scholarship.

Elliott is a dual major in physics and Russian studies in the Eberly College of Arts and Sciences. His goal is to pursue a doctoral degree and become a university professor.





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## From the director: *encourage young people - especially girls - to experience summer outreach*



**Taylor**

Inspiring girls to explore science, technology, engineering and mathematics (STEM) careers is vital for their future job prospects and our future economy.

It is especially important to target girls in middle school and expose them to the wonders of science through interesting, hands-on experiments and activities. After all, that is the age where potential female scientists are often lost.

There are several ways of accomplishing this. First, support initiatives such as Establishing Mentoring Pipeline of Women through Education and Research in STEM (EMPOWERS) to encourage girls' curiosities

and often at no cost thanks to grants.

Second, summer means university K-12 outreach programs including West Virginia University, West Virginia University Institute of Technology, Marshall University and West Virginia State University as well as The Clay Center in Charleston. Many include both co-educational and girls only options.

Finally, undergraduate students can take advantage of free time by undertaking research opportunities, especially through the Summer Undergraduate Research Experience (SURE) grants, funded from our very own Research Challenge Fund.

Jan R. Taylor  
Director, West Virginia Science & Research and NSF EPSCoR  
Project Director  
West Virginia Higher Education Policy Commission

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