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F. Robin O'Keefe
Marshall University

F. Robin O'Keefe is "the Plesiosaur Guy."

Marshall University

"When you Google 'Plesiosaur,' Robin comes up pretty quickly."

O'Keefe, professor of biology at Marshall University, has dedicated his life to evolutionary biology and paleontology. A self-proclaimed "Air Force brat," he spent much of his adolescence hopping from base-to-base with his family before settling in Seattle. His interest in the natural world started young.

"Like a lot of little kids, I loved dinosaurs," O'Keefe said. "I had my first fossil collection in a cigar box when I was 9 or 10 years old. I mailed away this comic book for a 50 cent collection, got one of my dad's cigar boxes, drew little lines in the bottom of the box and put each fossil in its own little space. I wasn't just a typical kid who was into dinosaurs for a few years and then goes on to other things."

O'Keefe earned a Bachelor of Science in Biology from Stanford University and a Ph.D. in Evolutionary Biology from The University of Chicago. He spent three years editing textbooks for Addison Wesley and six years at New York College of Osteopathic Medicine before an ideal job opened up at Marshall University. O'Keefe found his niche because of the school's dedication to research and teaching.

"Marshall values both of those things and I wanted that. I wanted to teach undergraduates. I wanted to have graduate students. I wanted to do research. I wanted to do it all. Finding a place where you can do that, and both are valued, is actually kind of rare."

A firm believer in the "publish or perish" paradigm, O'Keefe's work has been featured in numerous publications including scientific journals *Science*, *Nature* and *Palaeontologia Electronica* as well as media outlets NBC News, CBS News, BBC News, MSNBC, National Geographic, Scientific American, Smithsonian and The Guardian. O'Keefe has also lectured worldwide including a 2010 invitation to China for a symposium on Triassic marine reptiles.

O'Keefe's most notable work was an August 2011 paper in the journal *Science* revealing that a 78-million-year-old plesiosaur fossil contained the bones of one large fetus. This discovery was the first evidence that plesiosaurs gave birth to live young instead of hatching multiple eggs.

"The reason that fossil kind of fell in my lap was because I was 'the Plesiosaur Guy.' I had published enough over the last ten years that when my colleague Luis Chiappe at the Natural History Museum of Los Angeles needed 'the Plesiosaur Guy' to work on this he called me."

The paper states that this plesiosaur birthing a baby of that size would be like a human female delivering a six-year-old. However, skeptics pointed out that this phenomenon could have been the result of cannibalism or the reptiles simply fell on top of each other before dying.

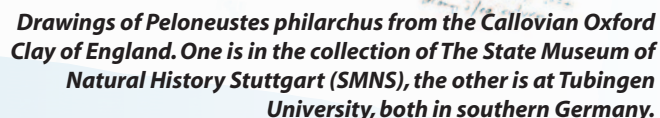
To further test the finding, O'Keefe turned to histology, a branch of anatomy that deals with the minute structure of animal and plant tissue. By testing the theory this way, questions like how big plesiosaur babies were at birth and whether they were warm-blooded or cold-blooded were answered. Examinations also showed stomach acid did not eat away at the infant's bones and some of those bones were actually inside of the mother's skeleton.

"The good news is that it all checks out. We take this histological approach and we come up with the same basic story that the females were giving birth to very big babies. That's exciting for me because you went from a completely different direction and different kind of data and you get the same answer."



Christina Byrd (MS '13), Mark DeBlois (MS '13), Alexandria Brannick (MS '14), and Josh Corrie (MS '13) on a field course with O'Keefe and the Marshall Geology Department at Big Bend National Park.

"It just gives me a really deep sense of wonder. I think that if we can translate that sense of wonder to people, to kids and adults, we'll have a better audience when we want to talk about climate change or global warming or other serious discussions that we need to have as a culture and as a species."



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WVSOM FACULTY MEMBER SEES THE POSSIBILITY IN EXPANDED CLINICAL RESEARCH

Jill Cochran, Ph.D., APRN, C-FNP is making a difference in the health and lives of West Virginia residents through medical practice and research. Her research lab is not the typical basic science research lab with test tubes and microscopes.

Instead, it has medical equipment and real patients - the clinic exam room.

"Welcome to the patient lab," Cochran said. "You can't separate medical practice and research. In the clinic 'every day practice' is a type of research and we use that research to change how we treat patients. It is easy for medical professionals to feel as though they are not contributing to research due to the demands of a full practice," she continued. "However, if a health practitioner is seeing patients, then they are collecting and evaluating data. As we notice patterns of success (e.g.; improved patient health) in our practice, we need to collect, evaluate and report this data."

WVSOM provides Cochran the ideal setting for a health care professional. As a WVSOM faculty member, she is encouraged and supported to conduct clinically based research through the West Virginia Clinical and Translational Science Institute (WVCTSI) and she practices primary care at the WVSOM Robert C. Byrd Clinic (RCBC).

Cochran has been led to specific research projects through observations in her own practice. "We need to take the problems we face in practice and translate the questions into research. Currently, our latest clinical research has to do with reconciliation of medications taken by our patients," Cochran said.

Cochran attempted to obtain a comprehensive list of all medications and supplements from her patients to understand the possible interactions of the medicines. After experiencing first-hand with her mother how difficult it was to compile an accurate list, she wondered if there was a way to improve a patient's health through "med reconciliation," — the reconciliation of all medications used by one patient and what affect their interaction has on that patient.

Cochran's plan was to understand and improve patient reporting of all medications to include over the counter, prescription medications and home herbal supplements. The research project began by asking patients how they report medications and what would help them remember to report all medications and supplements.

As a part of her research, Cochran began to consider the serious ramifications of physicians making decisions on incomplete or false information. She determined that different methods of gathering medication lists could be tested and data collected on what seemed to work in the Robert C. Byrd Clinic. Then, with the support of a WVCSTI HOPE (Health Outcomes and Policy Evaluation) grant she began collecting data on clinical tools with patients. One tool, titled Med Manage, has had great success. Clinicians use a drawing of a human body to "walk through" each area, symptom or malady to ask what medication the patient is taking.

"We are working to make an impact in primary care. We can help patients and families have a more thorough knowledge of all of their medications," Cochran said. "Thus far, our team has seen a significant increase in the number of reported medications from patients when the Med Manage tool has been used."

Cochran's next round of this clinical project, which will involve two WVSOM students, will focus on geriatric patients. She is also focused on finding the appropriate platform to share findings in clinical research.



Jill Cochran, Ph.D., APRN, C-FNP.

"We need to take the problems we face in practice and translate the questions into research."

Jill Cochran



Cochran (left), working in the clinic.

"Clinical translational research is driven from the bedside of patients. What works, what doesn't, where are there consistent records of success and how do we share that information?" she asked. "At WVSOM, we're preparing students to not only take excellent care of their patients, but to understand and evaluate their care models using Quality Improvement and Quality Assurance. We can all learn from each other."



Dr. Sanjaya inspects a tomato cultivar in a greenhouse powered by a solar pump and generator for off-grid irrigation use at Arava Institute for Environmental Studies, Israel. Sanjaya was one of 23 scientists nationwide who took part in the 2017 Inaugural Winter Faculty Fellowship Program in Israel.

WVSU PROFESSOR TAKES PART IN INAUGURAL WINTER FACULTY FELLOWSHIP PROGRAM IN ISRAEL

A West Virginia State University (WVSU) professor was among a group of national research scientists who took part in Jewish National Fund (JNF) and Media Watch International's sponsored 2017 Inaugural Winter Faculty Fellowship Program in Israel in December and January.

Dr. Sanjaya, director of the WVSU Energy and Environmental Science Institute, was one of 23 professors from universities and colleges across the U.S. chosen to experience what promised to be a once-in-a-lifetime and insightful journey.

Sanjaya and others spent 12 rigorous days throughout December and January traveling throughout Israel, meeting Israeli professors from their respective disciplines with the same, or similar, research interests, all with the goal of developing collaborations, research projects, co-authoring articles and establishing exchange programs between faculty and students.

"This is a tremendous opportunity for West Virginia State University to help facilitate collaborations on research and education between the U.S. and Israel," said Dr. Orlando F. McMeans, WVSU's vice president for research and public service. "Dr. Sanjaya is a great representative to share our work in agriculture, energy, the environment and water quality, while meeting and learning from international scientists working in the same research areas."

During the trip, the participants met Israelis from all walks of life and heard from a variety of speakers. They were also exposed to contemporary Israeli society, culture, historical sites, the people and the way of life in Israel.

"This faculty fellowship to Israel was a wonderful opportunity to interface with a country which is very good in agriculture technology and tech startups," Sanjaya said.

Sanjaya's lab is leading an active research program to design plants and microalgae with enhanced bioenergy, nutritional value, industrial compounds and phytoremediation for higher production, profitability and sustainability.

In addition to WVSU, participating schools included Johns Hopkins University, Emory University, Arizona State University, University of Florida, Liberty University, Ohio State University, University of Pennsylvania, Baylor University, University of Rhode Island, Providence College, St. Ambrose University, South Dakota State University, University of Texas-El Paso, and California State University-San Marcos.

The Winter Faculty Fellowship Program in Israel is a competitive academic fellowship that invites full-time university and college faculty members to apply to participate in a two-week Winter Fellowship in Israel. The program links scholars from diverse disciplines with their Israeli counterparts at major institutions for the purpose of initiating exchanges and collaborations.



Photos Courtesy of West Virginia State University

WVU SOFTWARE ENGINEERING PROGRAM 15TH IN US NEWS RANKINGS

For the second straight year, West Virginia University's online graduate program in software engineering has been ranked in the top 15 nationwide by U.S. News & World Report in its Best Online Program rankings.

The program, offered by the Statler College of Engineering and Mineral Resources, was one of more than 1,300 online programs reviewed in categories ranging from student engagement, faculty credentials and training and peer reputation.

"In an ongoing effort to increase access to WVU degrees through online education, we are excited to be recognized with these rankings across a wide variety of programs," said Keith Bailey, dean of WVU Online. "These rankings recognize our commitment to student success and instructional excellence in online learning."

According to Program Coordinator Dale Dzielski, the software engineering program focuses on continuous improvement by offering the latest in advanced coursework including data analytics, Internet of things and cloud computing, cybersecurity, mobile app and agile development.

"We are honored to once again be among the top 15 universities in the country to offer excellent online graduate education to the software engineering industry," Dzielski said. "We continue to focus on quality online education by utilizing the nationally recognized Quality Matters Program as the standard for online education. Our faculty deserve credit for having driven these improvements that has resulted in our national recognition."

Gene Cilento, Glen H. Hiner Dean of the Statler College, said faculty and staff in the Lane Department have done an excellent job fine-tuning the program to the needs of those looking to advance their education and careers.

"They have blended tenure-stream faculty with practicing professionals and this serves as a best-practice model for our other departments seeking to put courses online."

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SHEPHERD CHEMISTRY SOCIETY CHAPTER EARNS NATIONAL HONORS

The American Chemical Society (ACS) selected Shepherd University's student chapter to receive an honorable mention for its activities during the 2016-2017 academic year.

The chapter will be among those honored during the ACS national meeting March 18-22, 2018, in New Orleans.

Shepherd's chapter is one of 139 from across the country receiving honorable mentions that are listed in the November/December 2017 issue of "in Chemistry," the student member magazine. A letter sent to Shepherd President Mary J.C. Hendrix commends Dr. Dan DiLella, chair of the Department of Chemistry and chapter faculty advisor.

"Few faculty members are willing to make the great commitment of time and energy that a successful chapter requires," the letter said. "Professor DiLella's effort certainly represents the best in undergraduate science education and mentoring around the country."

DiLella said the ACS students have organized and participated in many scientific, educational and service activities over the past year.

"The chemistry faculty at Shepherd is very pleased and proud that these activities have been given this recognition by the American Chemical Society."

Among the activities the chapter participated in include hosting workshops for the annual Seeding Your Future conference for middle school girls, establishing study sessions for members to prepare for chemistry tests, hosting outreach experiments for special days such as Mole Day and Pi Day, volunteering for Relay for Life and Shep-o-Treat, judging local science fairs, hosting speakers and helping organize a science banquet at the end of the year.

"The award means a lot to us because it is a testament to the hard work that our members do to ensure that every event and project represents the values bestowed to us by Shepherd University and the Department of Chemistry," said Chapter President Benjamin Lanham of Martinsburg.

Shepherd's American Chemical Society student chapter also includes students Keer Mesineni and Devon Umstead, both from Falling Waters; Courtney Glascock, Berkeley Springs; Kevin Turner, Capon Bridge; Elin Greer, Bridgeport; Alyssa Roush, Parkersburg; and Lauryl Scott, Myersville, Maryland.



Members of Shepherd's American Chemical Society student chapter include Benjamin Lanham, Martinsburg; Kevin Turner, Capon Bridge; Alyssa Roush, Parkersburg; Elin Greer, Bridgeport; Dr. Dan DiLella, Department of Chemistry chair and chapter advisor; Courtney Glascock, Berkeley Springs; Keer Mesineni and Devon Umstead, both from Falling Waters; and Lauryl Scott, Myersville, Maryland.

D&E, DAVIS MEDICAL PARTNER FOR REALISTIC LEARNING LAB

A new partnership between Davis & Elkins College (D&E) and Davis Medical Center (DMC) will serve the community by preparing current and future nurses to give the best care to their patients in various settings.

The Center for Advanced Clinical Learning, a simulation lab and facility for inter-professional education located on the DMC campus, provides an opportunity for D&E nursing students and the hospital's nurses to learn and practice in a realistic and risk-free environment.

The idea for the simulation lab came about when Davis & Elkins President Chris A. Wood and Davis Health System President and CEO Vance Jackson were discussing the needs of each of their facilities, how they could help one another and in turn serve the community.

"This project is mutually beneficial to the College and Davis Medical Center in that we are able to provide a better education for our nursing students and Davis Medical has a working lab for their nurses," Wood said. "We also recognize the need for a greater number of health care providers, especially in the rural areas, and this gives us the opportunity to prepare our nursing students to fill those roles in a setting where they may choose to work upon graduation."

Jackson said the Center for Advanced Clinical Learning is this collaborative academic-practice partnership strengthening the link between education and clinical practice. "It will greatly enhance the health care workforce in our region and serves as a successful example of how partnerships can evolve to address similar challenges and create opportunity."

Approved by the West Virginia Board of Examiners for Registered Professional Nurses in October and officially opened in November, the lab consists of individual units, such as an emergency room and pediatrics, each furnished with the same supplies and equipment use in clinical settings.

Davis Medical Center Director of Education Brenda Mason says the hospital is eager to incorporate this latest technology into its education department and provide interactive strategies and engaged learning for its employees.

"Medical professionals must be technically skilled and prepared to respond to a patient's changing needs, and the simulation lab sharpens those skills for our health care providers and students," Mason said. "This expansion gives us additional capacity for education, a priority at DMC, which helps ensure that we provide the best patient care possible to our community."

Learning how to recognize and respond to a clinical situation in a simulated setting will allow students to be prepared to respond appropriately in actual clinical situations. Whether the situation is a patient experiencing a seizure or a child with worsening asthma symptoms, the mannequins will display with life-like symptoms requiring the student's nursing skills.

Davis & Elkins College and Davis Health System have shared a decades-long partnership in training students in various health care fields, and many D&E alumni have made their career at the hospital. The simulation lab adds another level to the relationship.

"We've been thinking about this since 2016 and it's so important to us at Davis Medical and our local community," said DMC Vice President and Chief Nursing Officer Pam Smithson. "It allows us to share space, equipment and skills in an actual realistic environment."



The simulation lab will prepare current and future nurses to give the best care to their patients in various settings.



WANG TO CONDUCT NEUROIMAGING STUDIES ON PEOPLE WITH AUTISM

According to the Centers for Disease Control, one in every 68 children born in the United States has a form of autism. Children with autism spectrum disorder typically pay less attention to faces and other social stimuli, preferring to fixate on objects. Shuo Wang, an assistant professor of chemical and biomedical engineering at West Virginia University, is hoping to find out what role a portion of the brain may play in this behavior.

Wang will conduct electrophysiology studies on abnormal signaling in the amygdala, the brain's alarm circuit for fear and a critical brain structure for social behavior. His work is being funded by a three-year, \$200,000 grant from The Dana Foundation, the first ever received by WVU.

"The amygdala is thought to play a major role in what people determine is salient — what they notice and pay attention to — as reflected in their eye movements, learning and behavior," Wang said. "Studies using functional magnetic resonance imaging in people with ASD have shown that abnormal activities in the amygdala is correlated with abnormalities in the way they attend to faces. This correlation might be due to problems with the neurons in the amygdala or with the neurons' connections to the visual or prefrontal cortex."

Since ASD is associated with an increased risk of epilepsy, Wang and his research team plan to study patients who require surgery to treat the seizure disorder. Electrodes placed inside the brain will be used to record the activities of individual neurons, which will then be correlated with autistic traits. Forty patients are expected to be part of the study.

"Electrical recordings will investigate the neuronal basis for two behavioral deficits in autism: a bottom-up and a top-down attentional deficit, both of which differ from findings in healthy volunteers," Wang said. "On the one hand, the bottom-up deficit shows that when viewing natural scenes, people with ASD tend to focus on the image's center regardless of what objects are in the periphery. They also pay less attention to faces and locations indicated by others' gaze. The top-down deficit shows that contrary to the way healthy volunteers show an efficient search strategy to locate a target object or face, the search strategies by people with ASD are far less efficient, especially when searching for faces."

Wang believes the electrophysiological recordings will provide a key missing ingredient from fMRI data.

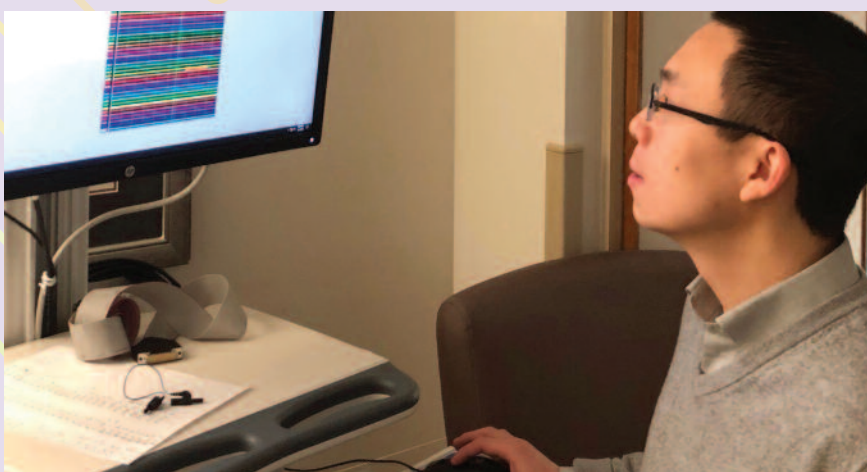
"Benefiting from our complex stimuli and sophisticated computational model, this research will provide the most comprehensive analysis of saliency representation in the amygdala with the highest spatial and temporal resolution to date," Wang said. "The results generated from this research will shed light on the neuronal mechanisms underlying impaired social attention in autism and provide a key missing link between animal neurophysiology and human fMRI."

Wang has done extensive research on human neuroscience. Prior to coming to WVU in 2017, he did postdoctoral research at both Cal Tech and Princeton University. This is his first award at WVU.

"Dr. Wang's research will foster knowledge in this important and unexplored area," said Cerasela Zoica Dinu, associate chair for biomedical engineering. "It also creates active networks between different entities at WVU, namely the Statler College of Engineering and Mineral Resources, WVU Health Sciences Center and the Rockefeller Neuroscience Institute."

"Dr. Wang's research will foster knowledge in this important and unexplored area."

Dr. Cerasela Zoica Dinu



Wang will record neural activities using intracranial electrodes from neurosurgical patient's comorbid with epilepsy and autism spectrum disorders.

ELECTRIC CAR CHARGING STATION NOW AVAILABLE ON MARSHALL'S HUNTINGTON CAMPUS

Marshall University unveiled an electric vehicle (EV) charging station on its Huntington campus in January.

The station is now operational in the pay parking lot adjacent to Corbly Hall, at the corner of John Marshall Drive and Fifth Avenue. It is the first EV charging station on campus and is available for public use.

The dual unit station, with two "Level 2" chargers, is self-service and easy to operate. Charging is free. Users can just "pull up and plug in," leaving their vehicles at the charging station while they are in class or attending university events. Users will be required to pay the standard fee for the parking space.



Marshall University graduate student Yangbo Song is one of the first electric car owners to use the new charging station on Marshall's Huntington campus. Song owns the newly opened Shangri-La restaurant in Huntington.

Marshall biological sciences instructor and electric car enthusiast Dr. Fredrick "Rick" Walker donated the charging station.

Marshall University President Jerome A. Gilbert thanked Walker for the donation at the unveiling ceremony, saying, "Rick's generous gift supports not only Marshall's commitment to sustainability, but it also will be an incredible learning tool for our entire university community."



Biological sciences instructor Dr. Fredrick "Rick" Walker, left, and President Jerome A. Gilbert show off Marshall University's first electric vehicle (EV) charging station, located in the parking lot next to Corbly Hall on Fifth Ave. in Huntington.



(Left to right): Dr. Steven Leftwich, chair of the WVU Tech Department of Civil Engineering; Dr. Govindappa Puttaiah, retired professor, former chair of the WVU Tech Department of Mechanical Engineering and executor of the Swami estate; and Carolyn Long, WVU Tech Campus President.

ENGINEER AND EDUCATOR: LEGACY OF DR. SWAMI PRESERVED IN \$85,000 SCHOLARSHIP

There's a thirty year period running from the late sixties to the mid-nineties where students in WVU Tech's civil engineering program worked alongside a rare breed of professor. His name was Dr. Shanmugam Armugam Swami – he went by S.A., or simply "Swami" – and his legacy as a dedicated educator has been honored in the form of a newly established scholarship.

The S.A. Swami Memorial Scholarship Fund was established in the name of the late professor by Swami's wife Anusuya, who herself passed away in 2017. Valued at more than \$85,000, the scholarship will continue Swami's legacy of helping promising students earn a degree in civil engineering. Swami was a professor of civil engineering and taught at WVU Tech from 1968 until his retirement in 1996.

Dr. Govindappa Puttaiah, former chair of the WVU Tech mechanical engineering department, was a professor at WVU Tech for nearly five decades until his retirement. He worked alongside Swami, developing a relationship with the professor and his family that lasted decades. After Anusuya's passing, he became executor of the Swami estate.

"In her will, she indicated that the school would establish a scholarship fund in Swami's name," Puttaiah said. "Swami was a very dedicated teacher and Anusuya wanted to continue his memory. In the process, she wanted to help students. College has become very expensive and she wanted to do something within her power, so she decided to help students who could really use it."

On December 6, 2017, Puttaiah visited campus to share that gift with the department and celebrate alongside faculty, staff and students.

Dr. Steven Leftwich, chair of the civil engineering department at Tech, was on hand during the presentation to accept the gift.

"This scholarship will be going to three needy students each year with a family income equal to or less than \$40,000, who maintain a grade point average of 2.0 on a 4.0 scale and who pursues a bachelor of science in civil engineering," Leftwich said.

Everyone knew Swami and, by all accounts, he was a kind person and an effective educator. He was a health enthusiast and was known to skip rope during the day to stay fit. During his time at WVU Tech, Swami even taught physical education seminars in the community and wrote three nontechnical books on everything from spirituality to fitness.

Dr. Krishna Murthy taught in the civil engineering department at WVU Tech from 1977 until 2010. He worked alongside Swami during much of his tenure at the institution.

"Swami was a colleague and a dear friend," Murthy said. "We loved books. We would meet with our families to read from the Bhagavad Gita. We'd have meals with international students to make them feel welcome. He was a friend, philosopher and guide to me. There are no two opinions about Swami. He loved his students, he loved his job and he knew what he was doing."

Leftwich knew Swami as more than a teacher. He was a role model, a mentor and eventually a colleague. A 1975 graduate of Tech, Leftwich started teaching at the university in 1987. He worked alongside Swami for nearly a decade.

"I had him for at least three courses as a student. Everyone liked Dr. Swami. He was a great person and very friendly. He taught transportation and highways, and he taught foundation design. The West Virginia Department of Highways alone has hired a very large number of Tech grads who all learned under Dr. Swami."

According to his book "Self Excellence," Swami came to the United States in 1964 with only eight dollars in his pocket. He later started his career as a graduate student at Purdue University. "What he had accomplished with only eight dollars is a testament to Dr. Swami," Leftwich said. "He had given back so much not only to his students but also to his colleagues, the university and his community."

After Swami retired, he and Anusuya moved back to India. Swami passed away shortly after in 1997. Now, over 20 years since his passing, Swami's impact is still felt at WVU Tech.

"Some students are not able to start or even continue their education because of money, and that's a simple fact," Leftwich said. "Hopefully this can help make the difference for students who are deserving of a chance at an education but not able to afford it on their own. It's something Swami would have been very proud to be a part of."

In addition to WVU Tech's civil engineering program, Anusuya left funds to Virginia Tech's English department, where her late son Jay was a student and a faculty member, and to Valley High School in Smithers, West Virginia.

WVU GRADUATE STUDENT LAYS GROUNDWORK FOR POTENTIAL NEW DIABETES TREATMENTS, RECEIVES NIH GRANT

Conventional diabetes medications tend to fix downstream problems, meaning they typically work by stabilizing blood sugar levels, not by improving the chemical processes that underlie how the body makes and processes blood sugar in the first place. A West Virginia University (WVU) graduate student is working to change that by studying an unexplored enzyme.

"It is like having a car that is leaking antifreeze, but instead of fixing the leak, you just keep buying cases of antifreeze and refilling the engine," said Stephanie Shumar, a graduate student in WVU's School of Medicine who is studying biochemistry and molecular biology.

The National Institutes of Health (NIH) has awarded her \$88,000 for a two-year investigation into how one enzyme, called Nudt7, regulates coenzyme A levels and glucose production in the liver. High concentrations of coenzyme A in the liver can trigger a surge in the production of blood sugar, whereas low concentrations can cause blood sugar to plunge.

Shumar says that a couple of papers have been written about the enzyme at the center of her work, but not much is known about it or its role in regulating coenzyme A and blood sugar levels. "We are very excited about this project and the potential therapeutic applications."

By focusing on an enzyme that regulates glucose production, instead of on glucose itself, Shumar hopes to provide a knowledge base on which new medications that target coenzyme A can be built. Such medications may have a broader impact on diabetics' health, alleviating multiple complications at once and getting closer to treating diabetes itself, rather than just its symptoms.

"A lot of times, people who are diabetic also have cardiac problems, eye problems—all types of problems," Shumar said. "But the underlying problem starts with the diabetes, which leads to other issues. Whenever you take medication for your eye problems or your heart problems, you're still diabetic."

Given that diabetes is the leading cause of adult-onset blindness, the leading cause of kidney failure and the seventh-leading cause of death in the U.S., research like Shumar's, in support of "upstream" diabetes treatments, may have dramatic "downstream" effects on diabetic patients' well-being.

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Photo courtesy of West Virginia University.

WVU graduate student Stephanie Shumar was awarded \$88,000 from the NIH to research an enzyme that regulates coenzyme A levels and glucose production in the liver. Her work is relevant to blood-sugar stabilization in diabetic patients.

NEW BEETLE SPECIES NAMED IN HONOR OF WVSU ADMINISTRATOR

A West Virginia State University (WVSU) administrator has been immortalized as an insect. A newly discovered species of beetle has been named in honor of Dr. Orlando F. McMeans, WVSU's vice president for research and public service.

The beetle, named *Pachybrachis mcmeansi barney*, was discovered by Dr. Robert J. Barney, professor emeritus at WVSU. Barney served in a variety of administrative roles at WVSU before retiring in 2015, including interim assistant vice president for research and public service and associate dean and associate director of WVSU's Agricultural and Environmental Research Station.

"I wanted to name this beetle in honor of Dr. McMeans' unwavering support of my research and professional advancement," said Barney, who has named 20 new species of beetles throughout his career.

McMeans was notified of the discovery in December, when he received an official plaque in the mail signifying the naming.

"When I opened up the package and saw 'mcmeansi,' I was a little bit overwhelmed," McMeans said. "It's exciting as a research scientist and a professional to sort of live on forever in name."

McMeans joked that his family didn't believe him when he told them about the beetle.

"My aunt looked up the name online," he said. "She thought I was pulling her leg."

The discovery was made during Barney's comprehensive study of the beetles in genus *Pachybrachis*. It is black and yellow in color, reminiscent of WVSU's school colors, and has been found in scattered distribution from Maine to Arkansas.

Upon realizing the species was unnamed, Barney's process included thoroughly describing the new species, submitting to a journal for peer review and publication, and submitting a single specimen to an established museum for future reference. The *Pachybrachis mcmeansi barney* will be in the Museum of Comparative Zoology at Harvard University.



A newly discovered species of beetle has been named in honor of West Virginia State University (WVSU) Vice President for Research and Public Service Dr. Orlando F. McMeans. Named by WVSU Professor Emeritus Dr. Robert J. Barney, the "*Pachybrachis mcmeansi barney*" will be part of the Museum of Comparative Zoology at Harvard University.

"I wanted to name this beetle in honor of Dr. McMeans' unwavering support of my research and professional advancement."

Dr. Robert J. Barney

WVU TO CONDUCT COMMERCIAL-SCALE RESEARCH OF CLEAN TECH FOR COAL-FIRED POWER PLANTS

West Virginia University researchers are leading commercial-scale research and development of two new innovations at the country's most efficient coal-fired power plant in Maidsville, West Virginia. The devices, a corrosion sensor invented at WVU and a gas sensor invented at Los Alamos National Laboratory, could make coal combustion more efficient with fewer emissions and fewer unplanned outages, saving millions of dollars.

The WVU Electrochemical Systems Research Center (ESRC), directed by Xingbo Liu, plans to conduct experiments of the sensors at Longview Power, LLC's 700 net megawatt power plant with two projects that total \$1.8 million.

The projects are funded by the U.S. Department of Energy's National Energy Technology Laboratory with matching contributions from the participating organizations. Researchers from WVU, Los Alamos and two private-sector firms are collaborating on the efforts.

The ESRC, which is based in the WVU Statler College of Engineering and Mineral Resources, came about because of an \$850,000 award beginning in 2012 by the West Virginia Higher Education Policy Commission's Division of Science & Research under its Research Challenge Grant. "This new research demonstrates the importance of the Research Challenge Grant program for creating collaborative research centers like ESRC. Such collaborations lead to innovations that serve the interests of West Virginia and the nation. Clearly, this investment is paying off," said Gene Cilento, Glen Hiner Dean of the Statler College.

"We are very excited that Longview is working with us. They are an ideal partner because of their commitment to use the latest technology," said Liu, who is also a WVU professor of mechanical and aerospace engineering.

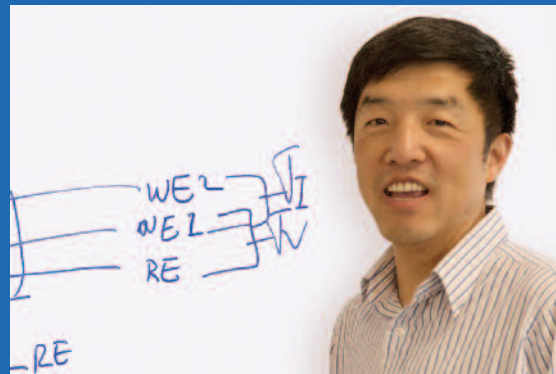
Longview employs state-of-the-art electricity generation and emissions technologies and best available control technology that outperforms current strict environmental regulations. The plant sets a new standard for future coal plants to achieve according to company officials. Longview is located near WVU's Morgantown campus.

The corrosion sensor team includes Liu and WVU Chemical Engineering Professor Debangsu Bhattacharyya; Chad Hufnagel of Longview Power; and WVU-spinoff Aspinity, led by Chief Technology Officer Brandon Rumberg, who will be developing the electronics. The gas sensor research team includes Liu; Hufnagel; Rangachary Mukundan, Eric Brosha, and Cortney R. Kreller of Los Alamos National Laboratory; and Michael Carter and Bennet Meulendyk of KWJ Engineering, Inc. who will be assisting with the gas sensor commercial packaging.

"It is an honor to be working with such knowledgeable people who are respected in their fields," said Liu. "For us to succeed at this scale, we need cooperation from experts who have different backgrounds and experience."

The corrosion sensor is a first-of-a-kind, wireless, self-powered device that can withstand the high temperature, ash-laden environment of the fire side of a utility boiler. The gas sensor will measure directly any carbon monoxide gases that indicate incomplete combustion, a sign of wasted fuel, lower efficiency, and elevated greenhouse gas and harmful air emissions. The goal is for both sensors to improve operations for any coal-fired boiler. The ESRC will work with WVU's Office of Technology Transfer to move the sensors to market if the commercial-scale tests succeed.

"This exciting collaboration led by ESRC is a perfect example of the partnerships across the university and with commercial partners for moving innovations from the laboratory into deployment. This project demonstrates how industry, government and WVU are leading West Virginia forward by deploying new and advanced technologies," said Brian J. Anderson, WVU Energy Institute director.



Xingbo Liu is one of the researchers leading commercial-scale research and development of two new innovations at the country's most efficient coal-fired power plant in Maidsville, W. Va.



BIOLOGY PROFESSOR PART OF INTERNATIONAL RESEARCH TEAM STUDYING SUMATRAN RHINOS



Mays, shown here holding a pangolin, is a member of an international team of researchers who have sequenced and analyzed the first Sumatran rhino genome from a sample belonging to a male made famous at the Cincinnati Zoo.

The Sumatran rhinoceros (*Dicerorhinus sumatrensis*) is one of the most threatened mammals on earth. By 2011, only about 200 of these rhinos were thought to remain living in the wild. Now, an international team of researchers, including Marshall University biology professor Herman Mays Jr., has sequenced and analyzed the first Sumatran rhino genome from a sample belonging to a male made famous at the Cincinnati Zoo.

This study, reported in *Current Biology* on December 14, 2017, shows that the trouble for Sumatran rhinoceros populations began long ago, around the middle of the Pleistocene or one million years ago.

The new insight into the rhinos' demographic history is useful for placing the species' current population status into a broader ecological and evolutionary context, the researchers say.

"Our genome sequence data revealed that the Pleistocene was a roller-coaster ride for Sumatran rhinoceros populations," Mays said.

"This species has been well on its way to extinction for a very long time," adds Terri Roth at the Center for Conservation and Research of Endangered Wildlife at the Cincinnati Zoo and Botanical Garden.

The Sumatran rhinoceros population peaked at a time when fossil evidence shows an invasion of continental mammals into Sundaland, a biogeographical region of Southeastern Asia, around 900,000 years ago, according to the researchers. By about 12,000 years ago — the end of the Pleistocene — many large mammals had suffered, and Sumatran rhinos were no exception.

Rising sea levels submerged the Sundaland corridor, and land bridges connecting the islands of Borneo, Java, and Sumatra to the Malay Peninsula and mainland Asia disappeared into the

ocean. As a likely result, the researchers say, the population of rhinos shrunk when suitable habitat became increasingly fragmented. Since that time, Sumatran rhinoceros populations have only dwindled further due to increasing pressures related to habitat loss and hunting.

"Their population bottomed out and never showed signs of recovery," Mays said.

The researchers came to these conclusions by using an approach called pairwise sequential Markovian coalescent (PSMC). PSMC makes it possible to elucidate the population history of a species from the genome sequence of a single individual, which is especially important for studying rare or extinct species. The team combined PSMC with ecological niche modeling to understand how changes in population size were related to climate change in the past.

The researchers estimate that the Sumatran rhinoceros population peaked at an estimated effective population size of approximately 57,800 individuals about 950,000 years ago. By 9,000 years ago, the genome evidence suggests, the effective population size was reduced to only about 700 Sumatran rhinos.

The findings suggest that climate change in the distant past reduced the genetic diversity of Sumatran rhinos, leaving them even more vulnerable to later pressures from human activity.

The DNA sample that Mays and his team sequenced belonged to a rhino named Ipuh, after the locality on the island of Sumatra where he was originally collected. Ipuh lived at the Cincinnati Zoo for 22 years until his death in 2013. Roth reports that two of Ipuh's sons continue to live at the Sumatran Rhino Sanctuary in Sumatra. One of them has already sired two calves.

"The Sumatran rhinoceros species is hanging on by a thread," Roth says. "We need to do more to save it."

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FROM THE DIRECTOR: DIFFERENCES MAKE FOR A STRONGER RESEARCH POOL

Variety is the spice of life. That appears to be the case when it comes to the very nature of science in West Virginia. All one has to do is skim the titles of this issue to understand academic research currently taking place in the Mountain State is as varied as the people conducting it.

Our cover feature is a globally-recognized paleontologist known for a specific specialization in marine reptiles who could operate from any place in the world, but chooses Marshall University in Huntington.

Clinical research has expanded in Lewisburg at the West Virginia School of Osteopathic Medicine with a more robust patient lab to train aspiring physicians.

Morgantown is home to a new commercial-scale research project with West Virginia University aiming to improve clean technology at coal-fired power plants.

West Virginia State University in Institute even has a vice-president with a newly discovered insect named in his honor.

Diversification can lead to new discoveries and new companies. The breakthroughs occurring in West Virginia are not limited to one industry, one school or even one geographic region. With no one holding the monopoly on good ideas and strong research, the potential is never-ending.

Jan R. Taylor
Jan R. Taylor, Ph.D.

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