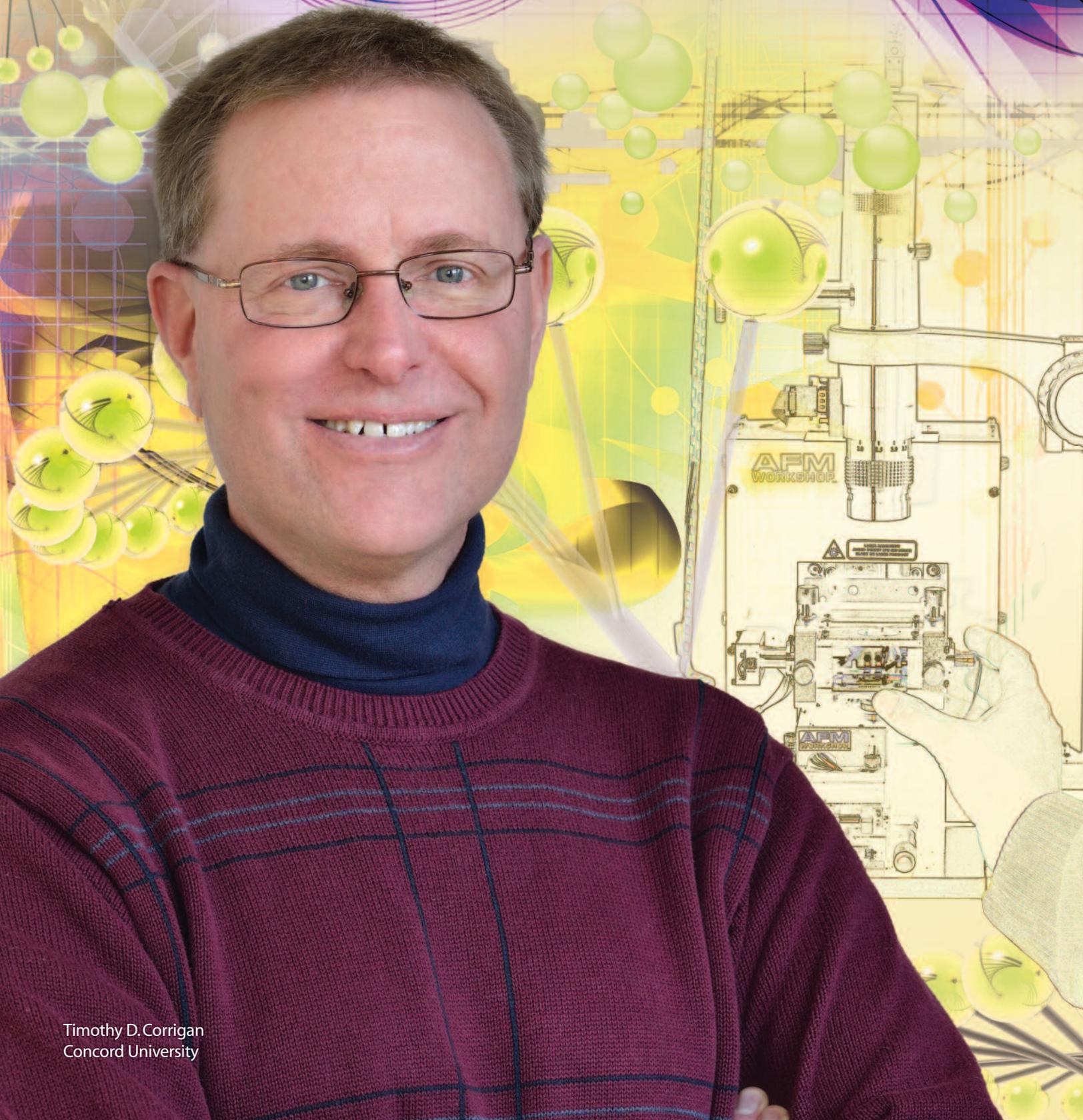


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Timothy D. Corrigan
Concord University

Sometimes the best things come in nano packages

Timothy D. Corrigan
Concord University

The big picture of Dr. Tim Corrigan's field of research starts with the very small. Most of what he does is on the nanoscale, in fact.

A great deal of Corrigan's materials science engineering research at Concord University was originally inspired by the events surrounding the attack on America on Sept. 11, 2001. While on the research faculty at the University of Maryland, Corrigan was tasked with research, funded by the National Security Administration (NSA) that could improve the signal of biosensors in response to the fear of biological warfare. If the signal on the biosensors could be improved, then scientists would have the ability to determine if there was a deadly substance in the air.

Corrigan said, "The thought was that if we could improve the sensor, then it could be developed at a lower power and turned into a hand held device which would be much more practical."

While his research was eventually halted by the NSA at the time, Corrigan is now in southern West Virginia and giving Concord's students the research opportunity of a lifetime by continuing the work.

A technique currently used in the pharmaceutical industry to achieve a similar goal uses florescent molecules, but those fade away after a relatively short period of time.

Corrigan said, "Basically the fluorescent molecules are used as markers that show whether an antibody or other agent of interest is present. If you shine one color of light in, the fluorescent molecule will shine a different light out if it is present."

In the lab at Concord, Corrigan is experimenting with quantum dots because of their more stable characteristics.

At first, Corrigan was simply purchasing quantum dots and shipping them to himself at Concord for the research. However, serendipitously, he now has Matthew Kessinger as an undergraduate research assistant who actually learned to make quantum dots last summer during his research internship at the University of Massachusetts (UMass). Kessinger's experience at UMass was funded via the National Science Foundation-supported Collaborative Undergraduate Research in Energy Program.

Essentially, quantum dots are semiconductor nanoparticles, 2 - 10 nm in size, that glow a specific color once illuminated by light. The color they glow depends on their size - the



about the division of 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.
Editor, Amanda Ramey (amanda.ramey@wvresearch.org).

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larger the dot, the redder the light. As the dots shrink in size, the emitted light becomes shorter in wavelength, moving toward the blue. A rainbow of colors can be emitted from a single material simply by changing the dot size.

Corrigan and his students are working to attach quantum dots to a gold nanoparticle-DNA origami template to increase the light coming out of the quantum dot. The gold nanoparticles act like nano-antennas for the light, and the DNA origami allows the quantum dots and gold nanoparticles to be placed in specific positions with nano-size control.

Much of this research is made possible via Corrigan's partnership with Dr. Michael Norton from Marshall University, prompted by West Virginia's current funding from the National Science Foundation under the Research Infrastructure Improvement (RII) program.

Corrigan said that potential future applications of his research could include improved bioassays, solar cells or optical circuits.

In the meantime, Corrigan has a goal that isn't on the nanoscale. He wants to inspire, motivate and encourage students.

Kessinger, for one, is motivated.

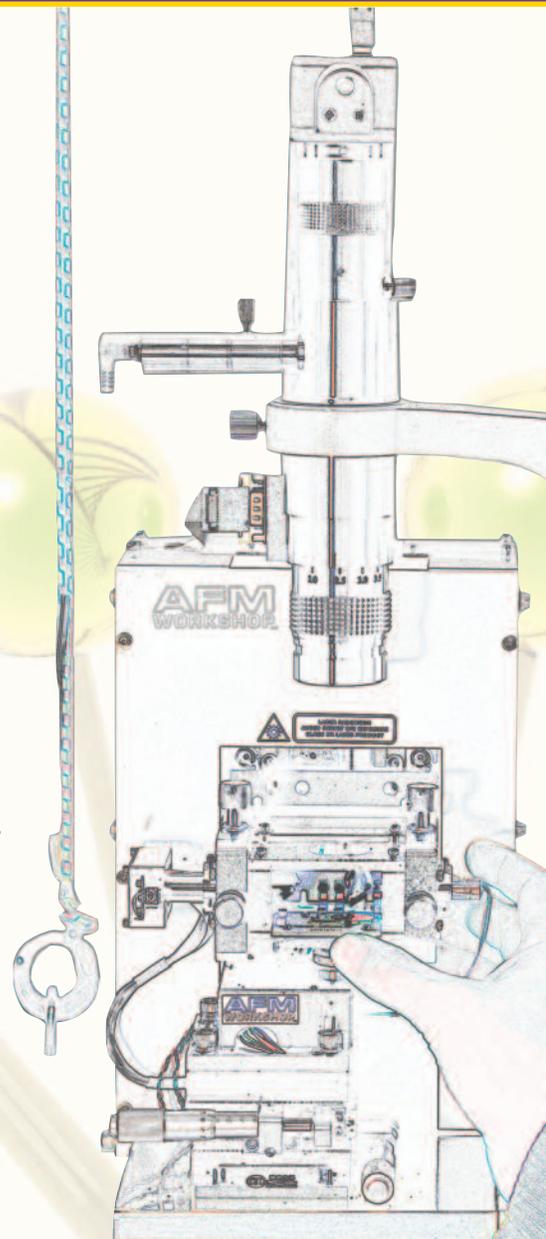
When asked about his experience at UMass and also about working with Corrigan, he said, "It's very beneficial to get involved in research. I'm glad I did because I now know for sure that this is what I want to do with my life."

Corrigan not only engages Concord undergraduates like Kessinger, he also reaches out to local high school students so they can see what research is all about at an early age. He hosted a student last summer from Princeton High school who he taught how to use the atomic force microscope in his lab – quite an accomplishment for anyone. Corrigan said the student also received a good grasp of how research is conducted. He plans to run a similar program next summer.

"I really want to provide students with high quality research project opportunities," he said.

For more about Corrigan's experience and the not-so-straight path that led him to the science field (and also to West Virginia), visit wvresearch.org.

Corrigan works with Kessinger in the lab. Kessinger is paid through the Primarily Undergraduate Institutions Incubator program, funded through the NSF WVEPSCoR grant (EPS-1003907). The goal is to enhance student training in nano and biotechnology to build the workforce.



An atomic force microscope which was purchased with a recent Instrumentation Grant from the Division of Science and Research

WVSU launches Energy and Environmental Science Institute

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West Virginia State University (WVSU) is focusing its energy on energy. The WVSU Energy and Environmental Science Institute (WVSUEESI) launched earlier this year with the mission of enhancing the school's capacity to participate in evolving opportunities in energy and environmental research, teaching and outreach.

"Our goal is to partner with public and private sectors so we can work together to address pertinent energy and environmental issues for West Virginia," said WVSUEESI Director Dr. Sanjaya.

Those issues include researching the feasibility and sustainability of alternative energy sources for the Mountain State as government regulation and environmental concerns continue to cast resources such as natural gas and coal in the national spotlight.

Those energy sources include renewable resources from plant-based biomass. Scientists at WVSU are conducting ongoing projects focusing on feedstock improvement, biofuels and bioproducts; biogas and microbial genomics; bioremediation, environment and sustainability. One project involves increasing the production of plant oils in the biomass of bioenergy crop that can be used in the production of biodiesel, and replanting onto formerly mined areas to determine how well crops will grow on reclaimed land.

One of the goals of the institute is to generate technologies and provide hands-on research opportunities to students and science-based outreach opportunities for K-12 youth throughout the region in hopes of generating the scientists of tomorrow.

"We are producing the future workforce in the sustainable energy industry," said Sanjaya.



Marshall School of Medicine researcher receives grant to continue musculoskeletal research

Maria A. Serrat, Ph.D, assistant professor in the Department of Anatomy and Pathology at the Marshall University Joan C. Edwards School of Medicine, and a team of multidisciplinary researchers from several institutions have received federal grant funds totaling \$383,000 to continue research into the effects of temperature on bone elongation.

Photo: Maria A. Serrat, Ph.D., (middle), is part of a group that received federal grant funds totaling \$383,000 to continue musculoskeletal research. With her are Holly Tamski (left), a student in Marshall's Ph.D. program in biomedical sciences, and Gabriella Ion, Ph.D., a research instructor in Serrat's lab.

Serrat says the three-year award from the National Institutes of Health and the National Institute of Arthritis and Musculoskeletal and Skin Diseases is an extension of work initially funded from a bridge grant from the American Society for Bone and Mineral Research.

"We hope our results will facilitate the design of heat-based, drug-targeting approaches to enhance bone length using noninvasive techniques such as warm temperature applications," Serrat said. "This work is significant because it has the potential to produce transformative findings that link heat, bone lengthening and vascular access to the growing skeleton which could lead to better clinical therapies for children in particular."

Serrat's team of collaborators includes Marshall graduate and medical students as well as faculty researchers from Cornell University, Mayo Clinic, the University of Kentucky and Ohio University.

"We are in the basic science stage of research and over the course of the three-year funding period hope to collect enough data to support a larger scale translational medicine project leading to a potential clinical trial with help from our collaborators at Mayo Clinic," Serrat said.

Photo by Rick Lee.



Dr. Dan DiLella (L), professor of chemistry and Department of Chemistry chair, and Dr. Peter Vila (R), assistant professor of environmental and physical sciences

Shepherd science professors receive grants to purchase **new equipment**

Two Shepherd University science professors received nearly \$40,000 in grant money from the West Virginia Higher Education Policy Commission's (HEPC) Research Challenge Fund to purchase equipment for use in their classes. The fund is managed by the HEPC's Division of Science and Research.

Dr. Dan DiLella, professor of chemistry and Department of Chemistry chair, received a \$20,000 grant to help purchase a nuclear magnetic resonance spectrometer, which is one of the most important tools used by chemists for determining the structures of molecules. DiLella said the instrument will be used almost on a daily basis for both undergraduate research and for teaching.

DiLella said use of the spectrometer is used extensively in the sophomore-level organic chemistry class for routine analyses. For most samples, the instrument is relatively simple to operate and a student can be trained fairly quickly. More sophisticated uses of the instrument will be examined in other upper-level courses and in research projects.

"For the last several years our students have not had the opportunity to operate an NMR instrument," DiLella said. "With this instrument they will gain practical hands-on experience that will be useful in their future careers."

DiLella said one of the requirements for approval of a chemistry program by the American Chemical Society is having an operational NMR spectrometer.

The other grant, in the amount of \$19,242, went to Dr. Peter Vila, assistant professor of environmental and physical sciences. It will be used to purchase a Eureka Manta 2 multiparameter water quality instrument that monitors the physical, chemical and biological attributes of aquatic systems.

Vila said the Eureka Manta 2 can simultaneously and accurately measure depth, temperature, dissolved oxygen, turbidity, conductivity, pH, oxidation reduction potential, rhodamine, chloride, chlorophyll and blue green algae in water, and that many of these things are critical for understanding the impact of variable environmental conditions on distribution, number and health of aquatic organisms.

Vila said having this instrument will help students prepare for future careers because it is widely used by professionals in the environmental science field.

"Students will learn to calibrate multiparameter probes in the laboratory, utilize and/or deploy them in the field to obtain data, and retrieve and analyze the data from the instrument for subsequent analysis, interpretation and presentation," Vila said. "This instrument is a critical component in many environmental and ecological applications and would expose Shepherd students to current technology and facilitate future employment or graduate education."

*Gay Stewart**Jeffrey Carver*

WVU earns \$1.45 million grant to establish training program for science and math teachers

West Virginia University (WVU) has received a \$1.45 million grant from the National Math and Science Initiative to establish the highly-regarded UTeach program, a unique teacher-training program for secondary science, technology, engineering and mathematics (STEM) teachers.

The UTeach program attracts high-performing undergraduate students majoring in STEM disciplines to the teaching field and prepares them for careers as teachers in secondary education. The program is rigorous, but supportive and allows students interested in math and science to earn both a degree in their major as well as a secondary teaching certification without adding time or cost to their four-year degree program.

WVU's program, WVUteach, will be co-directed by Gay Stewart, director of the WVU Center for STEM Education, and Jeffrey Carver, director of STEM education initiatives in the College of Education and Human Services. WVU will officially launch its program with a kick-off event in spring 2015.

"This is truly a comprehensive effort across many disciplines," WVU Provost Joyce McConnell said. "It will require tremendous focus to recruit, prepare, develop and support the most highly qualified teachers, but that effort will yield not only more science and math teachers, but more teachers who will remain in those fields and contribute to the success of school-aged students."

Stewart, who has been interested in STEM teacher preparation for 15 years, said that UTeach is the most exciting program she has encountered. "I came to WVU this year because of the potential I saw in a research university deeply committed to fulfilling its role as a land-grant institution," she said. "WVU and the governor have placed a focus on STEM education. WVUteach will be at the heart of the University's efforts to improve STEM education across the state."

The key elements of the program include collaboration across colleges, student recruitment and support, compact and flexible degree plans, a focus on research-based strategies for teaching and learning math and sciences, early and intensive field teaching experiences and personal guidance from master teachers and faculty.

The UTeach program has a successful track record as 81 percent of the more than 2,100 UTeach graduates nationwide have entered teaching. Of those graduates, 64 percent are teaching in the highest-need schools.

For more information about the National Math and Science Initiative, visit www.nms.org.

For more information about the about UTeach Institute: visit www.uteach-institute.org.

Three WLU students awarded Bucks-for-Brains fellowships



West Liberty University (WLU) students Nicole Sadecky, Adam Kenney and Nancy Isner have been named 2014-2015 Bucks-for-Brains research fellows.

Each recipient receives a \$3,000 stipend sponsored by a grant from the West Virginia Research Trust Fund as well as from private sources. The stipends will be awarded in installments over the semester and summer to aid in the fellows' continuation of undergraduate research at West Liberty.

Sadecky is a senior biology student. She said the goal of her research, titled Determination of Crayfish Occupancy Rates Across the North, Middle, and South Forks of the Kentucky River, is to determine the status of the crayfishes within the headwater streams of the Kentucky River. She is working under Dr. Zachary Loughman. Once the status of the crayfish is determined, she said conservation methods can be applied to protect organisms living in the streams that are being impacted by surface mining.

Kenney is a junior biology student. Through his research under Dr. Joseph Horzempa, Kenney said that he is investigating whether or not mosquitoes can ingest *Francisella tularensis*, a pathogenic bacterium which in humans causes the disease tularemia, from flower nectar and subsequently transmit it to mammals, specifically humans. His project has been ongoing for two years. He said that the goal of the research is to reassess the

mosquito's role in tularemia infections, which could have a potential impact on public health.

Isner is a junior double majoring in mathematics and chemistry. She recently began a research project under Dr. Jon Serra that involves identifying the different heats of combustion of different grades and samples of gasoline and analyzing how efficient those samples are. The impact of her research, she said, is that it has a direct relation to how efficient we can run our engines.



AWESOME group contributes to inaugural Girls' Day at the Legislature with STEM activities, dialogue

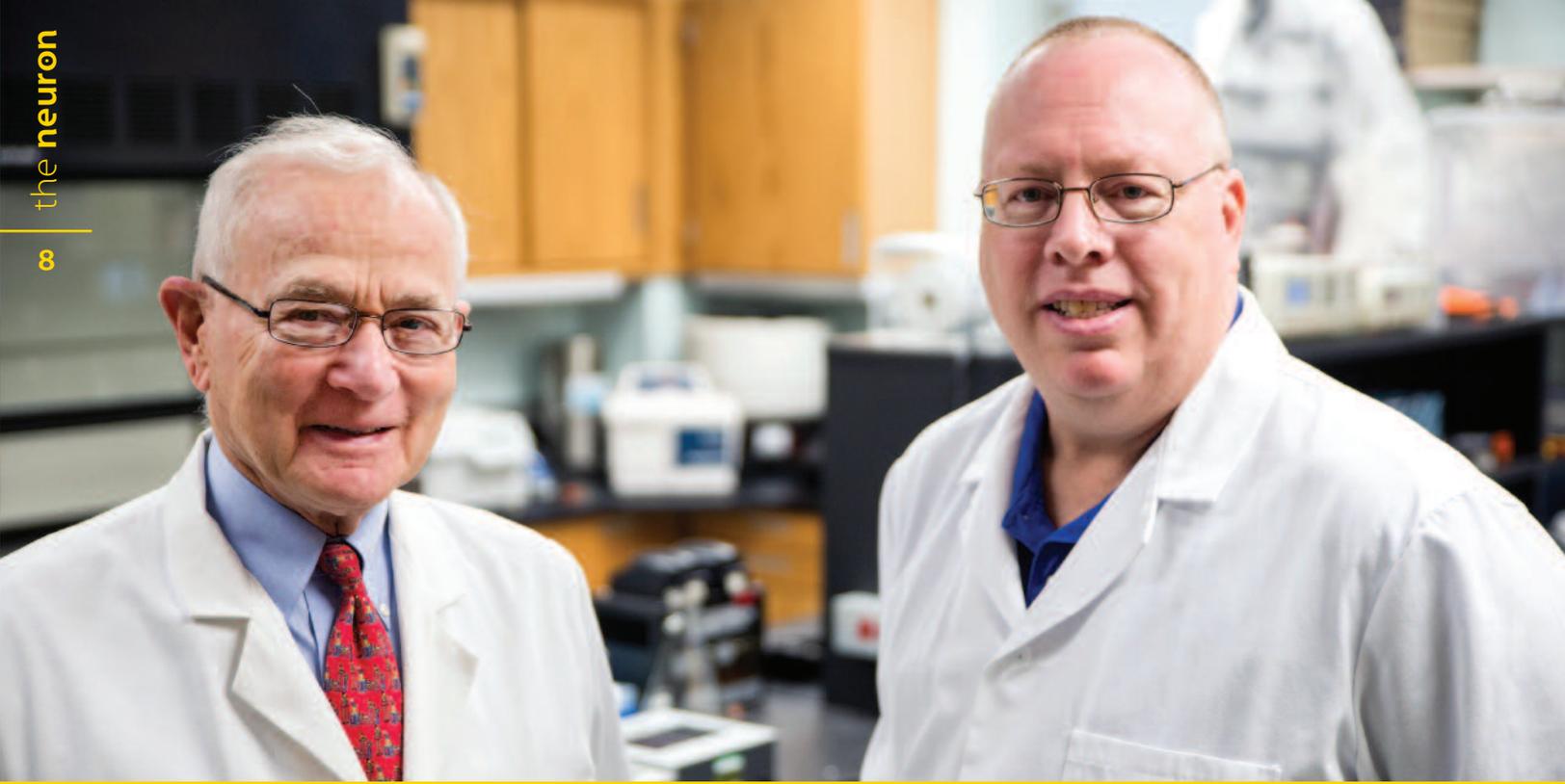
A dozen student and staff volunteers from the West Virginia University Institute of Technology (WVU Tech) Association for Women Engineers, Scientists, Or Mathematicians Empowerment (AWESOME) joined more than 200 middle and high school girls in the state's Capitol for the inaugural Girls' Day at the Legislature in early February.

Sponsored by the West Virginia Women's Commission and the Girl Scouts of Black Diamond Council, the first-ever Girls' Day was organized to allow young women from around the state to meet with legislators, speak in a youth forum, hear from guest speakers and sit in on a live legislative session. The event brought in students from 18 counties.

AWESOME, a group dedicated to supporting students in STEM fields and sharing STEM with girls in grades K-12, set up a series of activity stations in support of the event. Participants built towers using marshmallows and spaghetti noodles, crafted key chains that spelled out their names in hexadecimal computer code, learned about automobile systems and explored the principles behind chromatography as they tie-dyed AWESOME t-shirts.

Volunteers also shared their experiences studying STEM disciplines at the college level and encouraged attendees to chase those careers that interest them, no matter the field.

"AWESOME was excited and honored to participate in the Girls' Day at the Legislature," said Dr. Stephany Coffman-Wolph, AWESOME advisor and professor in the WVU Tech department of Computer Science and Information Systems.



Researchers celebrate silver anniversary together at School of Medicine

For just over a quarter of a century, Ronald J. Stanek and Maurice A. Mufson have worked as a team in the Virus Research Laboratory in the Department of Internal Medicine at the Marshall University Joan C. Edwards School of Medicine.

Stanek received his Master's Degree in biological sciences from Marshall in 1984 and began working with Mufson five years later. Mufson had been hired in the late 1970s as the inaugural chairman of the Department of Internal Medicine at Marshall. He and Stanek set about conducting virus research in the areas of pulmonary diseases, including pneumonia and bronchiolitis in children, serious lung diseases due to respiratory syncytial virus (RSV) and pneumonia and meningitis in adults due to the most common bacterial pathogen, the pneumococcus.

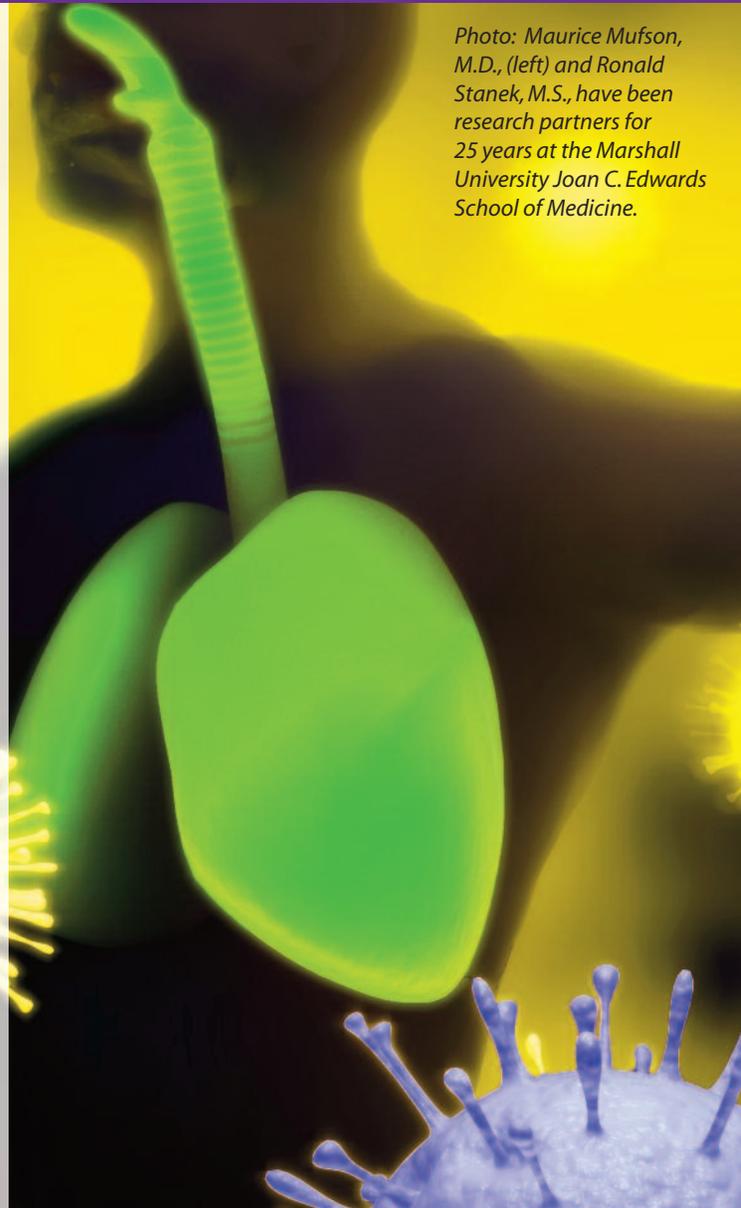
"Ronald's technical expertise quickly moved our research forward and eventually into interesting investigations on the molecular biology of the pneumococcus," Mufson said.

Mufson began the research on the pneumococcus more than 35 years ago, 10 years before Stanek joined the effort. Mufson said he believes it is the longest continuous research on the occurrence of the bacterial pathogen in one community in the United States. Stanek and Mufson also were the first investigators to demonstrate and report that serious pneumococcal pneumonia responded significantly better to treatment with two antibiotics rather than with one.

"My achievements were only possible through the exceptional mentoring from Dr. Mufson," Stanek said. "Our years together in the lab have been good ones."

Stanek has authored dozens of publications and abstracts in peer-reviewed scientific journals and has presented his research findings at numerous international and national scientific meetings. Mufson now serves as professor and chairman emeritus of the department of internal medicine.

Photo: Maurice Mufson, M.D., (left) and Ronald Stanek, M.S., have been research partners for 25 years at the Marshall University Joan C. Edwards School of Medicine.



WVU biometrics spinoff Confirmix secures major investment

Confirmix, a spinoff cybersecurity company from West Virginia University (WVU), recently announced that the company has raised \$1.25 million in angel investment to support the commercialization of innovative biometric technologies originally developed in the WVU Multispectral Imaging Laboratory.

“WVU is excited about this significant investment in Confirmix,” said Rob Alsop, vice president for legal, government and entrepreneurial engagement at WVU. “This round demonstrates the amazing quality of the research performed by our faculty and students and the entrepreneurial talent that is attracted to do business at WVU.”

According to the Federal Trade Commission, identity theft tops the list of consumer concerns. Reports of high-profile data breaches of personal information and photos from mobile phones and other devices have also spiked. At WVU, a team of researchers led by Thirimachos Bourlai, director of the Multispectral Imaging Lab and assistant professor in the Lane Department of Computer Science and Electrical Engineering, is using biometrics to combat the identity theft and online fraud that cause more than \$100 billion in annual losses to businesses and consumer products.

Confirmix will use its new funding to develop biometric technology for consumer identity and authentication products for both enterprise and consumers. Enterprise products will be marketed through the company's flagship brand, Confirmix. Consumer products will be marketed through the company's already-developed SecureSelfies brand and will focus on prevention of unauthorized access of mobile phones and tablets as well as photos and other personal information that are stored on such devices.

The SecureSelfies story began in Bourlai's lab.

Alex Dunn, Steven Amerman and Walter Ferrell, all computer science majors at WVU, were working in the lab when Bourlai approached them. The assignment was to develop a prototype of an Android phone application that was the earliest version of what became SecureSelfies, an app used to lock a phone using a “selfie” (a picture of the user taken by the user), as a security measure. The selfie is then used to verify the user when he/she wants to access the various services on their phone.

Biometrics uses body parts such as faces, ears, irises and fingerprints to identify people. Through research in the lab, Bourlai has been able to license technologies that include capabilities for image enhancement and restoration, face and eye detection, task detection and matching and dual-mode and dual-scenario matching. These technologies provide the key components of next-generation identity-management solutions that will allow reliable user confirmation and authentication that can prevent unauthorized access to data.

Bourlai founded Confirmix with a team of Morgantown-based entrepreneurs who have led technology startups at all stages. The startup company initiated its working relationship with WVU through the new Center for Smart Defense, which led to the identification of the licensure opportunity.



Students and faculty members take part in a **national biomedical research conference**

Bluefield State College (BSC) students Chelsea Brown, Jonathan Kinder and Shane Musick along with faculty members Dr. James Walters and Dr. Tesfaye Belay attended the Annual Biomedical Research Conference for Minority Students (ABRCMS) of the American Society for Microbiology (ASM) in San Antonio last fall. The students were featured in biomedical research areas during the poster sessions at the conference.

"At the meeting, our students exchanged information with other microbiologists and gained insight across a variety of scientific disciplines," Belay noted.

Musick, from Belay's laboratory, was one of 210 winners from a field of 2,100 students of an award for outstanding research and poster presentation.

"This prestigious award allows Mr. Musick to be a student member of ASM for one year. It also provides a travel award to participate in the General Meeting of ASM to be held in New Orleans, May 2015, and makes him eligible to compete for a student scholarship from ASM," Walters said.

Walters and Belay served as abstract reviewers and onsite poster presentation judges. In addition, they established contacts with institutions that are interested in BSC students for graduate programs.

Travel awards for the students were provided by the West Virginia Idea Network of Biomedical Research (WV-INBRE), the McNair Scholars Program of Concord University and from the office of Dr. Ann-Jo Robinson, Vice President for Student Affairs and Enrollment Management at BSC.



Marshall Ph.D. student receives **Chancellor's Scholarship**

Tenacious. Passionate. Driven. These are the words that Sean Piwarski uses to describe himself.

Piwarski is the most recent recipient of the Chancellor's Scholarship, given to a student in Marshall University's Joan C. Edwards School of Medicine Biomedical Sciences Ph.D. Program. The Chancellor's Scholar Program is intended to recruit, educate and graduate underrepresented minority students in doctoral programs. It offers a substantial tuition benefit and stipend as well as professional research and career development opportunities.

Piwarski grew up in a bilingual, Hispanic household in California. He was recruited to California Lutheran University on a football scholarship, where he double-majored in biology and chemistry. One of his biggest influences was Dr. John Tannaci, who taught organic chemistry at California Lutheran, and to Piwarski's surprise, made it fun and relatable. Piwarski said that was not something that he often found in his science courses, so one of his goals is to bring that level of passion and interest to a new generation.

With his strong science background, Piwarski chose Marshall University to obtain his Master's Degree in forensic science, focusing on toxicology and drug chemistry. In deciding how to apply the knowledge and skills gained through that program, he realized that a Ph.D. was the logical next step, particularly with the interdisciplinary, team-based science program offered at Marshall.

His research focuses on determining how certain chemical mechanisms in specific toxins may work to stop cancer metastasis. He said it is a subject close to his heart, since several of his family members have lost battles with cancer.

"Science isn't so much about being the smartest person in the room; it's about tenacity," Piwarski said. "Try out creative ideas and don't be afraid to put yourself out there to further what is possible."

Once he completes the Ph.D. program, Piwarski says he will pursue an academic position where he can put the "swagger in science" and stimulate the same passion and drive for excellence in others.

WVU computer science, electrical engineering professor conducts wearable technology research

Students in West Virginia University's Lane Department of Computer Science and Electrical Engineering are conducting research using wearable technologies under the guidance of Frances Van Scoy.

Van Scoy, an associate professor of computer science and electrical engineering, was inspired to research the possible uses of wearable technologies after a friend suffered a traumatic brain injury. The injury resulted in aphasia, the impairment of language that affects the production or comprehension of speech and the ability to read or write.

"Many victims of aphasia still have their intellect, personality and vocabulary," Van Scoy said. "But they have difficulty communicating it to others, which is where this technology could help."

The Emotiv neuroheadset is a high-resolution, multi-channel, portable electroencephalography system that connects wirelessly to most computer systems. The headset has 14 EEG readers that are placed around the head. A group of students are using the Emotiv neuroheadset to create a thought-to-speech program that can be used for victims of stroke, aphasia or others maladies that affect speech. So far, the group has been able to recognize five words through the program.

"We predefine words then train the user on the word and see if they can repeat it back," said Kathleen Baker, a senior computer science and women's and gender studies dual major working on the project. "Currently we are using words that identify basic needs that, if able to be communicated, could enhance the user's quality of life."

EEG technologies were once so expensive, they could only be found in hospitals and medical centers, but the Emotiv neuroheadset is currently available to the public at the average price of a new gaming system.

"The Emotiv neuroheadset can be a household technology," said Baker, who is from Parkersburg. "The possibilities are endless."

To read more about Van Scoy and her students' research, go to wvresearch.org.



Francis Van Scoy



WVSU receives grant funds for new agriculture research and development projects

West Virginia State University (WVSU) received \$40,000 in grant funding for agricultural research projects relating to alternative growing methods for farmers and diversifying the crops produced in West Virginia, including the reintroduction of pecans as a viable crop. Each of the three grant awards are funded through the West Virginia Department of Agriculture's (WVDA) Specialty Crop Block Grant Program.

Once popular in the state, commercial pecan production in West Virginia stalled in the 1940s. However, the state's potential for commercial pecan production remains high. One of the WVDA grants will fund research seeking to reintroduce the nut as a viable crop for small West Virginia farmers.

"This project has the opportunity to develop an untapped market with a crop that hasn't been produced on a commercial scale since World War II," said WVSU Extension Agent Brad Cochran. "The pecan has an opportunity to be a very productive and valuable crop in the state, as well as one with a good bit of historical preservation and novelty as well."

The project will educate landowners on the necessary steps to begin production, how to care for and maintain pecan trees and the development of groves.

A second grant-funded project will investigate crops, production and economic returns on vegetables grown in high tunnel structures to develop recommendations for their use in West Virginia.

The project will help to develop a year-round planting schedule for farmers new to the technology, as well as enterprise budgets for growing crops in high tunnels. High tunnels are greenhouse-like structures that allow for season extension beyond the typical spring and summer months.

A third grant involves collaboration between WVSU Extension Service and the Kanawha Institute for Social Research and Action Inc. to assess the productivity and profitability of two alternative growing methods for specialty crops: tower garden structures for vertical growing and a nutrient film technique. The latter is a water-based, soil-free technique using gutter-like systems for water circulation.

Hundreds of middle and high school students attend engineering and sciences open house

West Virginia University Institute of Technology's (WVU Tech) campus was a flurry of activity late last fall as 900 students from ten West Virginia counties visited the school's campus for the annual Engineering & Sciences Open House.

The event allowed middle and high school students to witness dozens of presentations conducted by WVU Tech professors and students.

Visiting students learned about stream ecology and soil science, how steam turbines and power plants produce electricity and how air conditioning works. They saw a student-built racing buggy, watched a distillation column in action and fired t-shirts and tennis balls from a pressurized air cannon. Students also got a taste of college life on guided campus tours.

"We want students to see that they can study these fields right here, but our motivation goes beyond WVU Tech. It's a bigger mission to promote STEM in general and help students at these early ages to understand the beauty of STEM fields. If we can open the eyes of a student so that he or she finds something interesting in one of these fields, it may motivate them to seek a four-year degree and eventually make a great scientific contribution later on," said Dr. Z. Torbica, dean of the Leonard C. Nelson College of Engineering and Sciences at WVU Tech.



West Virginia Division of Tourism hosts "Go Outside and Fly Fish" event in Grant County; demonstrates the science involved

The West Virginia Division of Tourism hosted "Go Outside and Fly Fish" at Harman's Luxury Log Cabins in Grant County, West Virginia. Curtis Fleming of the Outdoor Channel's popular TV show "Fly Rod Chronicles," his pro staff and the West Virginia University Fly Fishing Club joined the Division to teach Petersburg High School and Chestnut Mountain Ranch School students the science and techniques of fly fishing and tying.

"Learning the art of fly casting alongside Petersburg High School and Chestnut Mountain Ranch School students—and having the opportunity to meet and speak to each of them about West Virginia, was truly an amazing experience," Deputy Secretary of Commerce and Commissioner of Tourism Amy Shuler Goodwin said.

"What I learned today—many thanks to Curtis, his pro staff and the WVU Fly Fishing Club—is that fly fishing is much more than going out and catching a fish. It's art and science in one—the physics behind casting, the biology of insects and fish behavior, the right way to tie a knot and, of course, the design."

In addition to the North Fork River, other fly fishing spots in West Virginia include: New River, Shavers River, Cranberry River, Elk River, Dry Fork River, Gandy Creek, Cherry River, Williams River and the South Branch of Potomac River. For an interactive map of fishing streams, visit: www.mapwv.gov/huntfish.

Credit: #GoToWV



Sawhney presents **international research on child health and mortality** at 142nd annual APHA conference

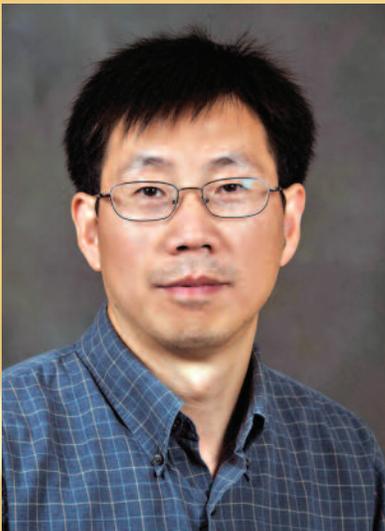
Dr. Monika Sawhney of the Marshall University College of Health Professions gave two oral presentations on her international research on child health and mortality in Kenya and health system efficiency in India during the 142nd American Public Health Association Annual Meeting and Exposition in New Orleans.

Sawhney, director of the college's undergraduate public health program, said, in most parts of the world, factors are improving with regard to child health, but this is not the case in many developing countries such as Kenya.

"While most countries experienced a decline in child mortality, Kenya experienced a rise in child mortality during the late 1990s and early 2000s, and one of my presentations reviewed the determinants for rise in child mortality in Kenya," Sawhney said. "Some of our findings indicate they are macro-level factors such as high prevalence of HIV, quality of childcare and health care providers and access to health care responsible for poor performance of child health indicators in Kenya."

Sawhney said this is a very timely topic due to the recent Ebola outbreak.

"Officials are working to address health disasters like the 2014 Ebola epidemic and findings from this research can highlight immediate needs and focus on basic health care (child and maternal care) concerns for years to come," Sawhney said.



WVU's Guo exploring the connection between **BMI and facial, physical characteristics**

It's been said that every face tells a story. But can a face also predict a person's build or risk for acquiring certain obesity-related diseases? According to Guodong Guo, an assistant professor of computer science and electrical engineering at West Virginia University, the answer is yes.

Guo and his team have developed an algorithm that can analyze a photo and predict a person's body mass index. BMI is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults.

"The software assesses seven weight-related components in a face image, including the ratios of cheekbone width to jaw width, face length to cheekbone width and the average distance between eyebrow and eye," said Guo. "This type of non-invasive analysis can have broad applications for combating obesity. It can also lead to large scale surveillance of public health and monitoring the health conditions of young children in schools."

Since it was first announced in 2013, Guo's work has received accolades from academia, industry and government agencies. Thanks to a \$200,000 grant from the National Science Foundation, Guo is now working to refine the technology in an effort to make it more robust by utilizing more sources of information, such as the visual information from both human face and body.

"The goal is to develop a visual information extraction approach to characterize and assess important body parameters related to health conditions," Guo said. "The study is based on an accurate shape information extraction from the face and body based on computer vision techniques."

According to Guo, the research and development from this project might be transformative for assessing human body parameters non-intrusively and precisely with a variety of real applications.

STEM success in the Mountain State

West Virginia Governor, **Earl Ray Tomblin**

Across West Virginia, our young people are aiming for greatness. Whether choosing a career path requiring a two-year degree from one of our state's community and technical colleges or a four year degree at one of our colleges and universities, many are considering futures in science, technology, engineering and mathematics (STEM) fields—and helping to lay a strong foundation for West Virginia's economic future.

Workforce projections indicate 44 percent of job openings in the next 10 years will require more than a high school education but less than a four-year degree. And in just four years, workplace demands will require an additional 20,000 college graduates in West Virginia to maintain the state's economy.

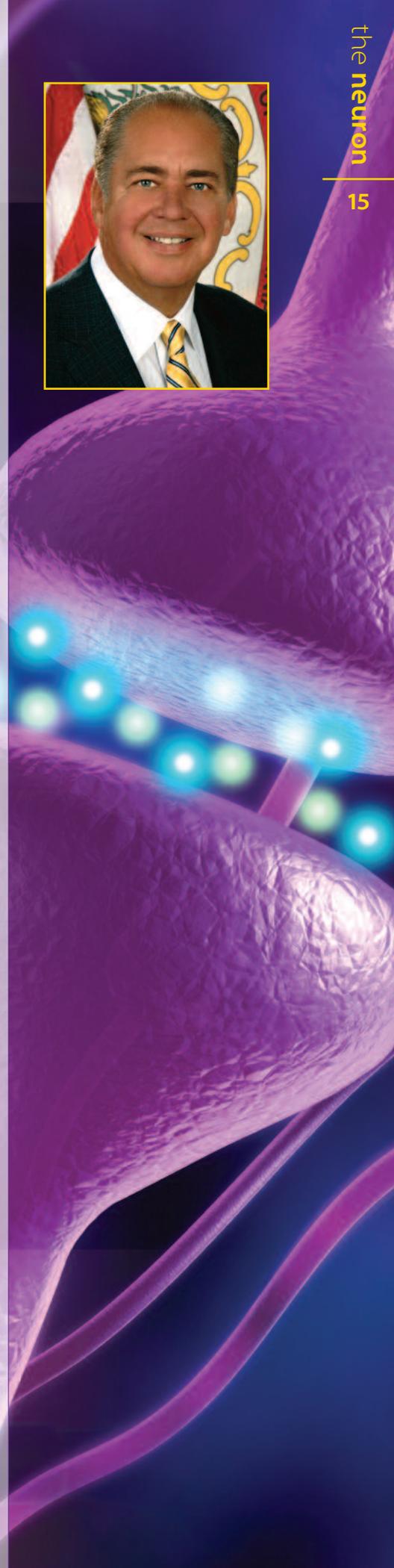
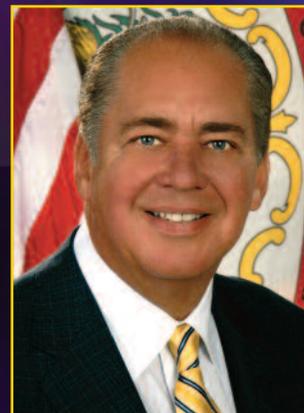
With the continued growth in the oil and natural gas and manufacturing sectors, we're taking the necessary steps to strategically expand West Virginia's workforce over the next five years with a focus on developing and enhancing STEM-related skill sets.

As we position ourselves to compete in today's global economy, we must start with our students—West Virginia's future workforce—by providing them with the tools and resources they need to succeed. By encouraging students to explore technology and innovation from an early age, we can help companies investing in West Virginia grow by supporting their future workforce employers in those fields need.

Recently, I joined fourth-grade students at Piedmont Elementary School for Computer Science Education Week, a STEM-related initiative that teaches the importance of computer, math and science skills. When I spoke to these students and asked how many of them liked their math and/or science classes, I was thrilled to see hands quickly shoot up across the classroom. In speaking to them, I explained that West Virginia is doing the best we can to help them prepare for their futures, and that the jobs awaiting them will require both math and science skills. And as I sat with them—solving math problems and practicing multiplication tables—I realized the work we're doing to prepare our future workforce will not only affect our state's future, but will position each of these students to succeed for years to come.

West Virginia's entire education system is stepping up to the task of providing business and industry with a solid, skilled workforce by adapting curriculum to meet the needs of businesses investing and growing in the Mountain State. From our local school systems to our community and technical colleges and universities, we're partnering with industry and spreading the word about initiatives, like Computer Science Education Week, to help our students understand the earning potential of the highly skilled, hands-on career opportunities available to them.

I'm proud our state has unprecedented opportunities for our young people today and for decades ahead. Through STEM-related activities, we are preparing our children for tomorrow's jobs and for a brighter future. Our young people are future leaders who will help drive our state's competitiveness by generating new ideas, new jobs and new investment. I can't wait to see what students—like those at Piedmont Elementary—have in store for the future of the Mountain State.



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FROM THE DIRECTOR: We're reaching out

As I hope many of you already know, we have recently launched a series in the state that we've dubbed the Chancellor's STEM Speaker Series. It

kicked off last fall, and we continued it with our second speaker in February. Our goal for the series is to promote the science, technology, engineering and math (STEM) fields to all West Virginians. The series has been supported thus far through a federal grant from the National Science Foundation as part of an outreach effort.

By bringing nationally-renowned speakers to the state, such as Alexandra Cousteau and John Medina (our first two speakers), we are seeking to connect a broad audience with fascinating science topics and the people who are passionate about them so that we all walk away with more knowledge - or perhaps just a new way to think about a particular topic. To say we have been pleased with the response to these events would be an understatement! In fact, we had such an overwhelmingly good response for John Medina that we had to close down our registration a few days in advance so that we could ensure everyone who attended would have a seat.

I encourage you to attend our spring event -which is in the planning stages right now. Keep an eye on our website (www.wvresearch.org) or our Facebook and Twitter pages for an announcement. Or, you can contact Communications Manager, Amanda Ramey, to get on our distribution list for details as soon as they're available. Her email address is amanda.ramey@wvresearch.org and her direct dial is 304-558-4128 ext. 7. Once we announce the details, be sure to RSVP early so you don't miss out!

More exciting news along the same vein is that we've launched a video series designed to connect West Virginia researchers with the greater public. A link to the videos, which are only about two minutes in length, can be found on our website. I hope you'll check them out as they really shine a light on the scientists at our own colleges and universities who are doing exciting work! We want more people to know them so that their research - and research in general - will be supported in a greater way in West Virginia.

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

Director of Science and Research
West Virginia Higher Education Policy Commission

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