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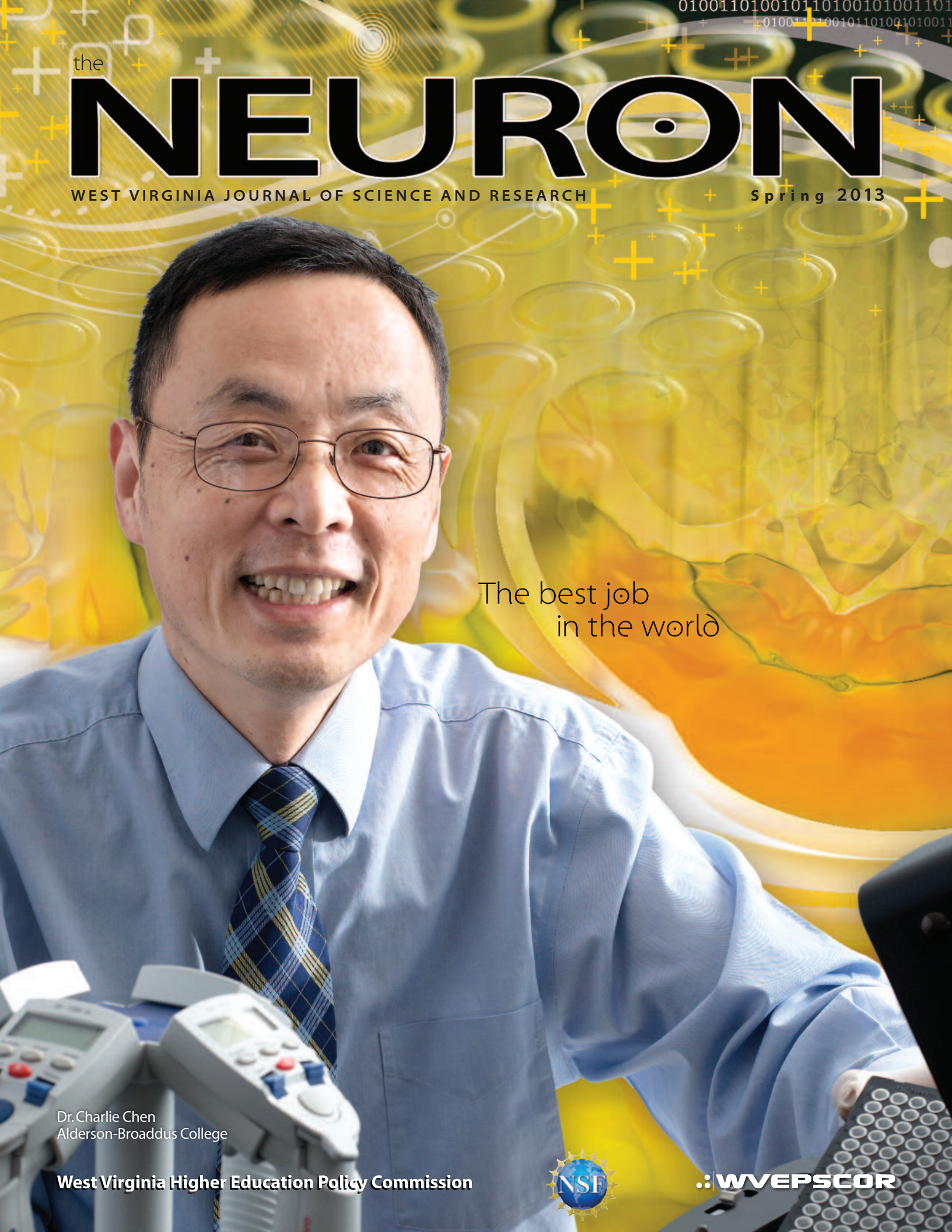


The best job in the world

Dr. Charlie Chen
Alderson-Broaddus College

West Virginia Higher Education Policy Commission
NSF
WVEPSCOR

DR. CHARLIE CHEN

Professor of Biology, Alderson-Broaddus College

The best job in the world

Dr. Yi Charlie Chen considers himself a fortunate man.

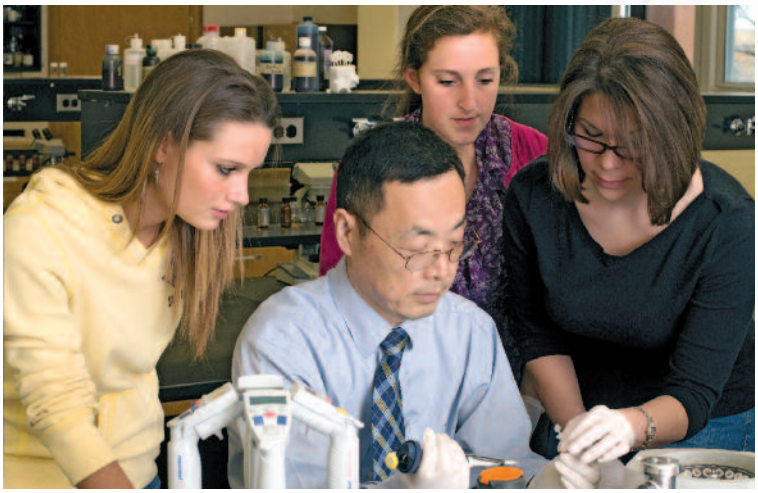
And why wouldn't he? The professor of biology and prolific researcher at Alderson-Broaddus College in Philippi is living his dream. As a teacher, researcher, husband and father, he has accomplished every goal he has set so far in life.

His next goal: sustaining the level of research he's helped create at the 800-student private college in north-central West Virginia.

If his good fortune continues, he'll also succeed in finding substances that inhibit growth of cancer cells without damaging healthy cells, thereby making great strides for cancer treatment.

From the laboratories at A-B's Kemper-Redd Science Center, Dr. Chen is collaborating with researchers from other institutions working on several cancer studies. In a two-year, $100,000 Research Incubator Grant, he is working with Dr. Bingyun Li of West Virginia University in a study titled "Nanochemoprevention as a novel approach to cancer control."

Funded through the state's five-year, $20-million Research Infrastructure Improvement Grant awarded by the National Science Foundation's EPSCoR program in 2010, Dr. Chen is researching the use of kaempferol, a natural compound found in berries and teas, as a substance to inhibit growth of ovarian cancer cells. His research so far has shown that encapsulating the kaempferol substance within certain nanoparticles improves the effectiveness of treatment.



Chen in the Biology Department labs with students Ashley Creed, Shannon Stewart and Tasha Howard

The Yi Charlie Chen file:

Bachelor's and master's degrees in Plant Protection, Zhejiang University

Master's in Entomology, Washington State University

Ph.D. in Entomology and Molecular Biology, Washington State University

Post doc: USDA, Oklahoma State University

On faculty at Alderson-Broaddus since fall 2000.

Alderson-Broaddus College becomes Alderson-Broaddus University on July 1, 2013. Learn more at **www.ab.edu.**

Photography by John Sibold

content

"I love teaching because it allows me to be with students and help them learn knowledge in science and technology. I get to see them grow. It's really a rewarding experience to me."

He and his students also are helping Marshall University's Dr. Piyali Dasgupta on a lung cancer study that was recently published in the prestigious journal *Cancer Research*.

And he is midway through a $350,000 National Institutes of Health grant on inhibiting tumor growth, all the while maintaining a vigilant search for new research funding opportunities.

Obtaining grants gives Dr. Chen and his students the opportunity to do biomedical research. Conducting research gives him opportunity to teach beyond the three or four classes he's assigned each semester.

"I love teaching because it allows me to be with students and help them learn knowledge in science and technology," he says. "I get to see them grow. It's really a rewarding experience to me."

It's evidently also rewarding to his students, who nominated him for the state's Professor of the Year award for 2012. He was a finalist.

Dr. Chen said he was fortunate to go to college in his native China, where at the time only two percent of high school graduates were accepted. He earned bachelor's and master's degrees, the highest level offered, at Zhejiang University, then taught there for six years.

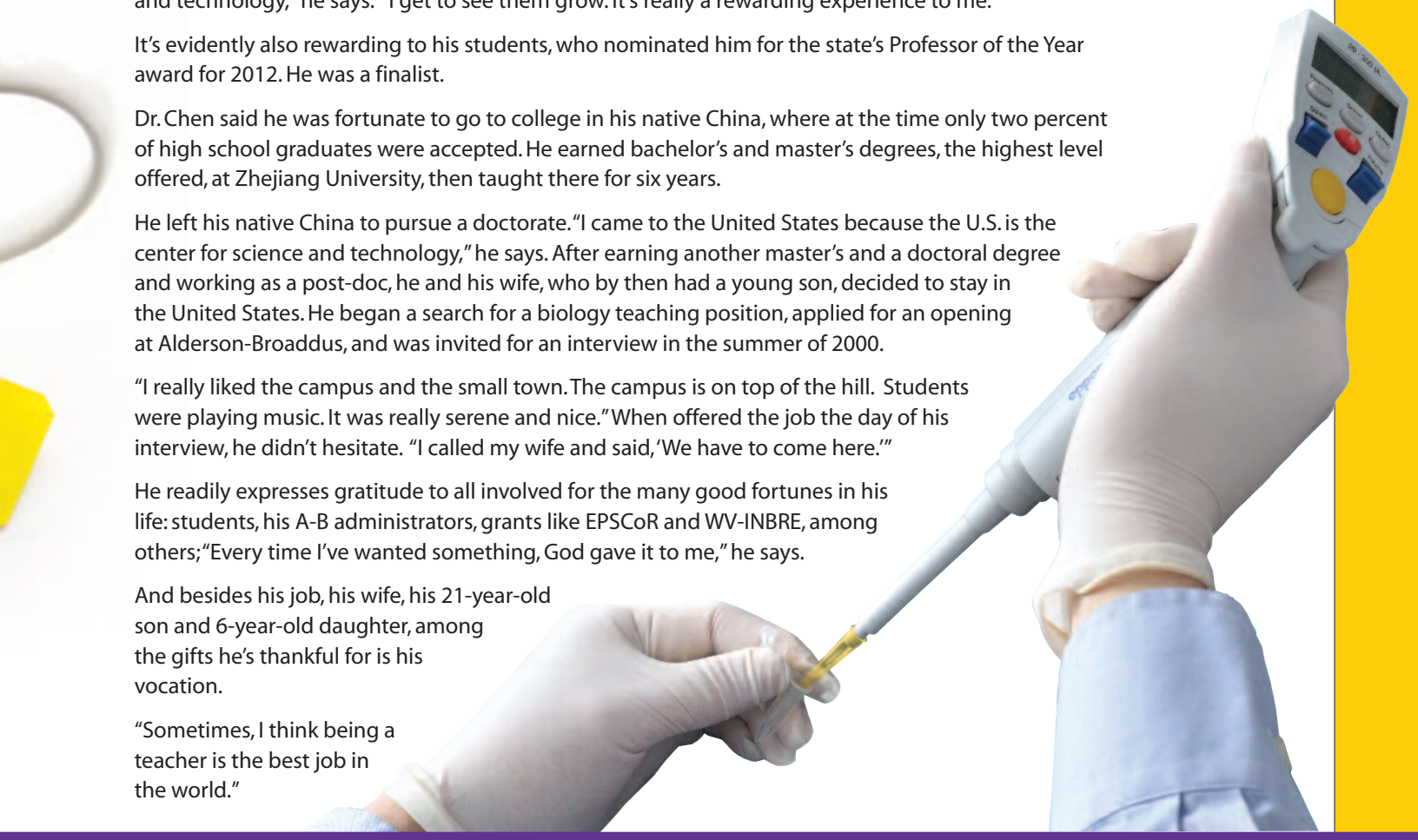
He left his native China to pursue a doctorate. "I came to the United States because the U.S. is the center for science and technology," he says. After earning another master's and a doctoral degree and working as a post-doc, he and his wife, who by then had a young son, decided to stay in the United States. He began a search for a biology teaching position, applied for an opening at Alderson-Broaddus, and was invited for an interview in the summer of 2000.

"I really liked the campus and the small town. The campus is on top of the hill. Students were playing music. It was really serene and nice." When offered the job the day of his interview, he didn't hesitate. "I called my wife and said, 'We have to come here.'"

He readily expresses gratitude to all involved for the many good fortunes in his life: students, his A-B administrators, grants like EPSCoR and WV-INBRE, among others; "Every time I've wanted something, God gave it to me," he says.

And besides his job, his wife, his 21-year-old son and 6-year-old daughter, among the gifts he's thankful for is his vocation.

"Sometimes, I think being a teacher is the best job in the world."



about the division of science and research

The West Virginia Higher Education Policy Commission's Division of Science and Research directs the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR) in West Virginia. The division also coordinates scientific research grants to academic institutions and conducts outreach activities to broaden the public's understanding of science, technology, engineering and mathematics (STEM) disciplines. For more information, visit **www.wvresearch.org**.

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Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

the evolution of energy

October 2013 **STaR** Symposium

The 5th-biennial Science, Technology and Research Symposium will take place October 22-23, 2013 at the Waterfront Place Hotel in Morgantown. The theme, appropriate for an energy state like West Virginia, is "The Evolution of Energy: From Scarcity to Abundance".

The keynote speaker will be David Pogue, *New York Times* columnist, author, *CBS News* correspondent and host of *NOVA Science Now*.

For the first time, this STaR Symposium will feature a student science video competition, replacing the traditional poster presentations. Undergraduate and graduate students at higher education institutions in West Virginia are encouraged to produce and submit a three-minute video to explain their research to non-scientists. Cash prizes will be awarded for the top two videos in the graduate and undergraduate categories.

The STaR Symposium is open to students, faculty, researchers, industry and businesspeople wanting to learn about energy use, energy conservation and energy research in the Mountain State. Learn what experts say about the realistic potential of energy development and use in West Virginia.

Complete information about the Symposium and the science video competition is available at **www.wvresearch.org/STaR**.

West Virginia researchers and faculty are encouraged to help promote the STaR Symposium. A printable flyer and suggested e-mail and social media tools are available on the website.

W.Va. 8th graders learn about **science** with ***Nanooze*** magazine

This spring, students at middle schools across West Virginia received the first-ever state edition of *Nanooze* magazine, a publication about nanotechnology.

Nanooze was provided free to all eighth-grade students by the Division of Science and Research as part of an effort to stimulate interest in science, technology, engineering, and mathematics (STEM) careers among middle school students.

"To be economically competitive now and in the future, West Virginia needs to produce more college graduates, particularly those trained in STEM fields," said Dr. Jan Taylor, director of Science and Research. "We hope this magazine and the guidance of classroom teachers can move our state toward the goal of increasing the number of students graduating in STEM fields every year."

"This magazine is an excellent example of informational text that teachers might use with their students," said Marty Burke, assistant director of the W.Va. Department of Education's Office of Instruction. "We encourage teachers to use *Nanooze* magazine to guide class discussions about science research, discoveries, and career opportunities."

Packages of *Nanooze* were mailed to all public and private schools in West Virginia with enough magazines for each of the nearly 22,000 eighth-grade students. An electronic version is available at **www.wvresearch.org/nanooze.** Individuals can request additional printed copies of the magazine at no cost through the website.

Learn about upcoming **STEM activities for kids** at **www.wvresearch.org/STEM**

The Division of Science and Research has established a new page on its website to promote Science, Technology, Engineering and Mathematics activities for kids in West Virginia.

The site, **www.wvresearch.org/STEM**, is designed for parents and teachers to check regularly to see what upcoming "STEMulating" activities will be in their area.

Organizations and institutions in West Virginia planning STEM activities for kids are encouraged to let the Division know about those activities so they can be posted on the site. Send information via the e-mail address listed on **www.wvresearch.org/STEM**, or mail it to the address on the back cover of this magazine.

Division of Science and Research announces **mini-grant winners**

The Higher Education Policy Commission's Division of Science and Research announced Research Proposal Mini-Grants of $5,000 each to six faculty.

The mini grants provide replacement salary for an uninterrupted period of time for a faculty member to write research or research equipment proposals during the summer. Each winning faculty member will then submit a proposal for funding to an external agency or foundation.

Mini grants were awarded to:

- **Joseph Allen**, Concord University;
- **Vagner Benedito**, West Virginia University;
- **Deborah Chun**, West Virginia University Institute of Technology;
- **Rosalyn Quinones**, Marshall University;
- **John Rakus**, Marshall University; and
- **Kaushlendra Singh**, West Virginia University.

The Research Proposal Mini-Grants are funded by the West Virginia Research Challenge Fund, which lays the foundation for many of the state's competitive grant programs.

Learn more at **www.wvresearch.org**.

"The Mini-Grant Program is an investment in research, education, and ultimately, in economic development. By allowing these faculty members the opportunity to concentrate on external research proposals, the State of West Virginia ultimately may realize benefits well beyond its $30,000 investment."

Dr. Jan Taylor, Director of Science and Research, West Virginia Higher Education Policy Commission

WVSU **student researchers win** in **national competitions**

Four research students from West Virginia State University took top prizes at the 1890 Association of Research Directors (ARD) Symposium this spring, marking the most honors WVSU has received at the event.

The ARD Symposium brings together researchers from the nation's 1890 land-grant universities. This year's event, in Jacksonville, Fla., showcased more than 300 posters and nearly 300 oral presentations. Fifteen WVSU students competed.

First-place undergraduate winners were Brian Wooten in the category of Renewable Energy, Natural Resources and Environment and Lori Morris in the Plant Health and Production and Plant Products category. Jason Thaxton earned a second-place award in the plant category.

Natalia Montenegro won first place in the graduate student category.

"I was shocked and humbled to not only come in second but to place overall because of so many quality projects competing," said Thaxton, who will graduate from WVSU in December. "It gives me an insight that I can do anything if I put my mind to it."

Another WVSU student took second place at the Mid-East Honors Association meeting in Dearborn, Mich. Doug Bright placed second for a poster presentation entitled "Developing a Modern Herbarium at WVSU."

"This outstanding showing by our students reflects well on the quality of student learning and mentoring being done by research faculty here at State," said Dr. Orlando F. McMeans, vice president for Research and Public Service.

WVSU's Jason Thaxton was one of four State students winning honors at the Association of Research Directors Symposium for 1890 land-grant universities. His entry was in the Plant Health & Production/Plant Products category. See all the winners with their awards at ***www.wvresearch.org/Neuron****.*

Funding for **collaborative medical research** announced at Marshall University

Marshall University Joan C. Edwards School of Medicine officials have announced $150,000 in funding for six research grants associated with the school's translational medicine research program.

The Marshall Health Translational Pilot Grant program, created in 2012, encourages collaborative research between basic scientists and clinical physicians in an effort to speed up the process from laboratory discovery to clinical application for patients. The grants are funded by Marshall Health.

"We are very pleased that Marshall Health has created this grant program to stimulate research efforts," said Richard M. Niles, Ph.D., senior associate dean for Biomedical Sciences. "Moving Marshall to the next level of medical research takes vision, commitment and, of course, funding. This grant allows 12 researchers, as well as medical residents and students, the opportunity to explore very diverse areas."

Marshall Health is the faculty practice plan for the Joan C. Edwards School of Medicine. The pilot grant program provides one year of support at $25,000 for each grantee, with additional funding based on progress of the research.

Read the names of the investigators and their studies at **www.wvresearch.org/neuron**.

Other translational research under way at Marshall includes a partnership with the University of Kentucky as part of the National Institutes of Health's Clinical and Translational Science Awards program, which also is aimed at speeding the time for laboratory discoveries to benefit patients.

Collaborative study will **measure methane emissions** associated with **NGVs**

The Center for Alternative Fuels, Engines, and Emissions (CAFEE) at West Virginia University is conducting a study to determine fugitive emissions of methane, a powerful greenhouse gas associated with routine operation of natural gas fleet vehicles fueled by compressed or liquefied natural gas.

Natural gas-powered vehicles (NGVs) are expected to play an increasing role in meeting future transportation needs. This study will measure methane leaks that occur at various stages in the refueling and operation of heavy-duty natural gas vehicles.

Natural gas is a cleaner-burning fossil fuel that consists mostly of methane. Natural gas vehicles have the potential to produce fewer greenhouse emissions than diesel—if methane leaks are kept low.

The Environmental Defense Fund, along with industry and research organizations, is sponsoring the project led by CAFEE. Sponsors include the American Gas Association, International Council on Clean Transportation, Shell and others.

The study will directly measure methane emissions at compressed and liquefied natural gas refueling sites and maintenance facilities, and emissions that result from operation of heavy-duty NGVs. Final results, expected to be released in a peer-reviewed journal by late 2013 or early 2014, will assist industry in developing improvements to fueling operations and identifying best practices for minimizing leakage.

"CAFEE has a 24-year history of advanced energy research with rapid delivery of data and research products," said Nigel Clark, WVU Engineering chair and principal investigator on the project. "This is right in CAFEE's wheelhouse."

Vehicles to be tested include transit buses, tractor-trailers, and vocational vehicle fleets.

WVU's Song Earns National Science Foundation **CAREER Award**

One of the byproducts of automobile exhaust and industrial power plants is waste heat energy, which is usually released unproductively into the environment. A $535,694 Faculty Early Career Development (CAREER) award from the National Science Foundation will allow West Virginia University researcher Xueyan Song to investigate ways to improve the sustainability of energy infrastructure through waste heat recovery.

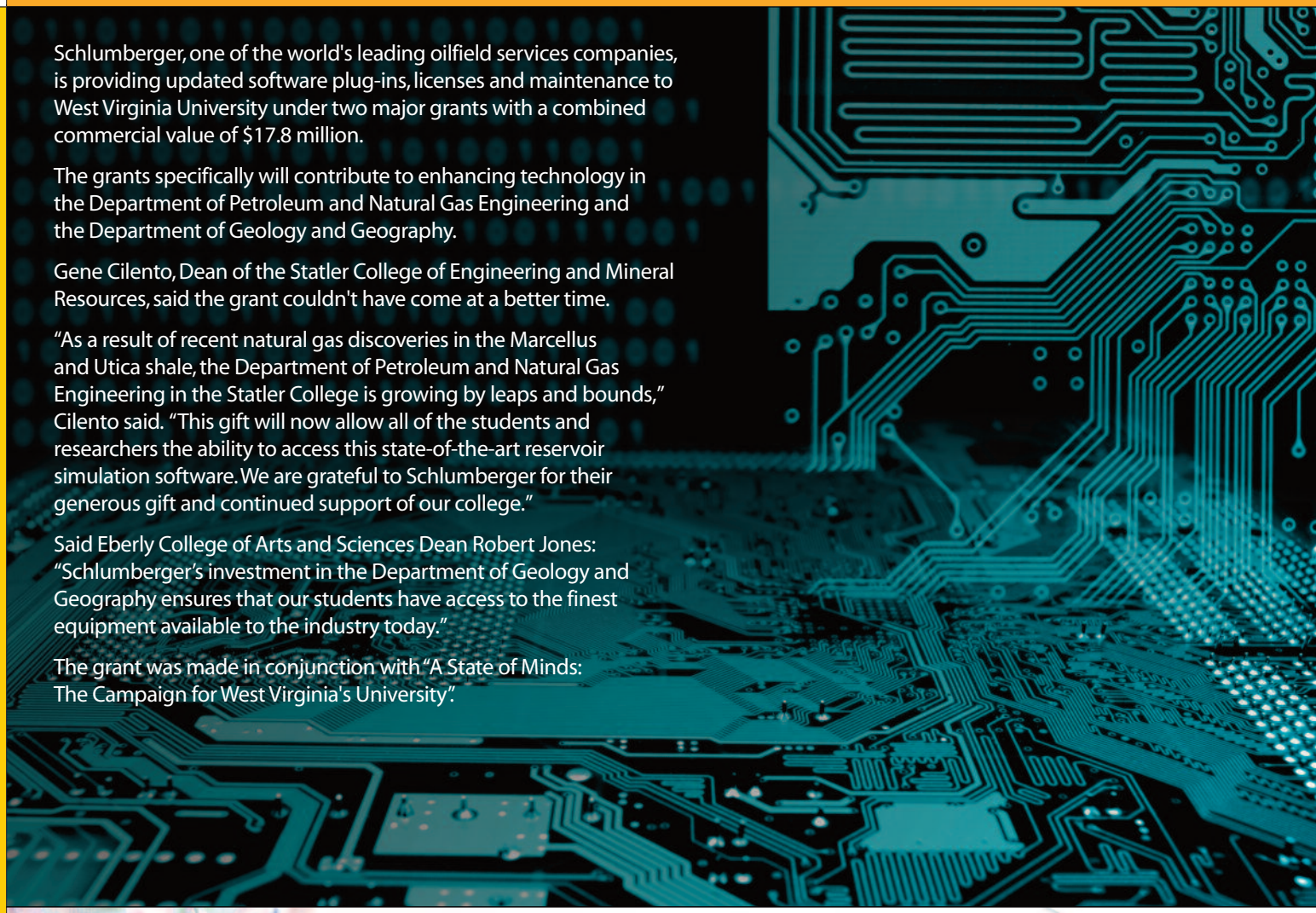
Song, an assistant professor in the Department of Mechanical and Aerospace Engineering, is involving high school teachers in her research.

"They are collecting their lab experiences in a journal, and designing and developing teaching materials about advanced materials for energy application for their classrooms," she said. The award will also help Song closely integrate her research into the undergraduate- and graduate-level courses she teaches.

Song has authored more than 50 peer-reviewed journal publications, including ones that have appeared in *Nature* and *Nature Materials*.

The CAREER Program offers the NSF's most prestigious awards in support of 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.

WVU receives **in-kind software gift** valued at **$17.8 million**



Schlumberger, one of the world's leading oilfield services companies, is providing updated software plug-ins, licenses and maintenance to West Virginia University under two major grants with a combined commercial value of $17.8 million.

The grants specifically will contribute to enhancing technology in the Department of Petroleum and Natural Gas Engineering and the Department of Geology and Geography.

Gene Cilento, Dean of the Statler College of Engineering and Mineral Resources, said the grant couldn't have come at a better time.

"As a result of recent natural gas discoveries in the Marcellus and Utica shale, the Department of Petroleum and Natural Gas Engineering in the Statler College is growing by leaps and bounds," Cilento said. "This gift will now allow all of the students and researchers the ability to access this state-of-the-art reservoir simulation software. We are grateful to Schlumberger for their generous gift and continued support of our college."

Said Eberly College of Arts and Sciences Dean Robert Jones: "Schlumberger's investment in the Department of Geology and Geography ensures that our students have access to the finest equipment available to the industry today."

The grant was made in conjunction with "A State of Minds: The Campaign for West Virginia's University".

Study focuses on **potential lung cancer therapies**

Scientists from Marshall University, with help from Dr. Charlie Chen of Alderson-Broaddus College (see page 2), have completed a study that may eventually lead to the development of new treatments for lung cancer.

Their results were published in a February issue of *Cancer Research*, the most frequently cited cancer journal in the world.

At Marshall, Dr. Piyali Dasgupta, associate professor in the Department of Pharmacology, Physiology and Toxicology in the Joan C. Edwards School of Medicine, worked on the study with her research team of Jamie Lau, Kathleen Brown and Brent Thornhill, and undergraduate students Cody Stover and Christopher McNees.

Researchers in Dasgupta's lab explore how the various components of tobacco, especially nicotine, advance the progression of lung cancer.

Read details of the cancer research here.

Bluefield State **student team wins regional steel bridge competition**

A Bluefield State College student team won the Virginia American Society of Civil Engineers (ASCE) Student Conference "National Student Steel Bridge Competition" regional championship at Howard University in Washington, D.C. The Bluefield State Steel Bridge Team advanced to the 2013 National Student Steel Bridge Championship May 31 in Seattle, Washington. (Check updated status at **http://www.bluefieldstate.edu**.)

The Bluefield State students competed against teams from Virginia Tech, West Virginia University, VMI, the University of Virginia, George Washington University, Marshall University, Old Dominion University, Catholic University, George Mason University, WVU Tech, and Howard University.

The team designed and fabricated their steel bridge based on a set of well-defined rules and specifications received in the fall semester. The actual competition involved bridge construction and load-testing. Teams were judged based on compliance to specs, construction time, weight, stiffness and aesthetics.

The BSC team constructed their bridge in less than 28 minutes. It was tested with a 2,500-pound load and deflected less than a half-inch at any point.

"The steel bridge competition provides students with an excellent project that conveys real-world principles into a student competition," noted Kerry Stauffer, the team's faculty advisor and associate professor of Civil Engineering Technology at BSC. "They are excited about competing and, in the process, they learn about meeting specifications, time constraints, design considerations, budget limitations, and teamwork."

"When I think about what we accomplished, I realize how well our team worked together," said captain Todd Atkins. "The competition was a great experience for all of us."

Added faculty advisor Stauffer: "The results of this competition show what students from Bluefield State College can accomplish and how they can compete with larger institutions."

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>
> Kerry Stauffer
> faculty advisor and associate professor of Civil Engineering Technology

The Bluefield State College ASCE student chapter after winning the regional student steel bridge competition championship. From left, faculty advisor Kerry Stauffer, Andrew Maynor, Austin Harris, Alex Quesinberry, Todd Atkins, Matt Halsey, Kyle Bowling, Adam Cline, Logan Copenhaver, and Amber Fitzgerald. Not pictured is T.J. Knight.

WVU **astronomers' discovery published** in ***Nature***

The Andromeda and Triangulum galaxies, neighbors to the Milky Way, are constructed of an immense number of stars. But a new study, led by a West Virginia University graduate student, has revealed a never-before-seen cluster of gas clouds between the galaxies that could potentially fuel the formation of more stars.

The study is published in the May 6 issue of *Nature*, a weekly journal that highlights original and groundbreaking research in science.

Lead author Spencer Wolfe, a graduate student in the WVU Department of Physics, and assistant physics professor D.J. Pisano worked with researchers from Case Western Reserve University, the University of Maryland and the National Radio Astronomy Observatory.

The astronomers detected the clouds using the National Science Foundation's Robert C. Byrd Green Bank Telescope at the NRAO site in Green Bank, W.Va.

Although previous observations of the Local Group, a galaxy group that includes the Milky Way, have indicated the possible presence of diffuse hydrogen gas between its members, this is the first time there has been such a detailed view.

"The question we're trying to answer is in what way is the Local Group and its members evolving," said Wolfe. "A lot of people tend to forget when they see pictures of the Milky Way that we're embedded in it. If it's evolving, we're going to evolve with it, so understanding the details of how galaxies like the Milky Way can acquire new gas and keep forming stars is important."

Observations completed by the group have shown that portions of the gas are clumped together mimicking dwarf galaxies. Dwarf galaxies, relatively small collections of stars bound together by gravity, can contain anywhere from a few thousand to a few million stars. The telescope also was able to track the motion of these newly discovered clouds.

"The study would not be possible without the unique capabilities of the Green Bank Telescope," Pisano said. "Its combination of sensitivity, resolution and its unique optical design were all critical for this study. There are no other telescopes currently operating or planned that will be as capable of doing this type of work as the GBT."

Through their observations, the astronomers suggested the clouds represent a previously unrecognized source of hydrogen gas that could lead to future generations of star formation.

View the Nature article here.

Math professor contributes to **new study on pandemic flu**

Pandemic flu continues to threaten public health, especially in the wake of the recent emergence of an H7N9 low pathogenic avian influenza strain in humans.

A recent study published in the peer-reviewed scientific journal PLOS ONE provides new information for public health officials about mitigating the spread of infection from emerging flu viruses. The report brings new insight into the H1NI pandemic of 2009 and may help officials prepare for future pandemics.

Marshall University mathematics professor Dr. Anna Mummert participated in the study, which was led by researchers at Mississippi State University. Researchers at the Georgia Institute of Technology and Universidad Miguel Hernández in Spain also collaborated.

During the 2009 H1N1 pandemic, along with the last three flu pandemics of 1918, 1957 and 1968, the United States experienced multiple peaks of infection. Normal seasonal flu outbreaks have only one peak of infection. The models showed that border control had some small effect on outbreaks.

"In 2009, China instituted strict border controls at the onset of the outbreak," said Dr. Mummert. "We developed models explaining the occurrence of the multiple peaks and tested border control strategies to determine if a strict border control in the United States could reduce the total number of infections."

Four of the models indicated that stricter border control is related to fewer waves of infection.

The research team plans further collaboration in understanding influenza viruses and how they spread.

View the full study here.

WVU's **Fanaei Earns NSF Fellowship** to Conduct **Research** in **Australia**

West Virginia University's Mohammad Fanaei, a doctoral candidate in electrical engineering, earned a National Science Foundation fellowship to conduct research this summer in Australia.

Fanaei will be working in the Center of Excellence in Telecommunications at the University of Sydney, from June-August 2013, under the supervision of Abbas Jamalipour, leader of the Wireless Networking Group.

Fanaei's research is focused on wireless communication systems, which have applications that include border protection, smart homes and remote habitat monitoring.

Fanaei hopes to eventually teach and conduct research in higher education where he can apply his knowledge to inspire a passion for communication systems in his students.

Chandra Grant allows **Wesleyan researcher** more time to **study "Cas A"**

When talking about the sky, it is hard to mistake the look on Dr. Tracey DeLaney's face as anything short of excitement. In fact, spend just a few minutes with this West Virginia Wesleyan College assistant professor of Physics and Engineering, and you may begin to wonder why you never studied science more.

DeLaney, who has spent many of her educational years studying the supernova remnant Cassiopeia A, has been awarded the Chandra Grant of $50,000. The funding will allow further study into this enormous nebula made from a star explosion by using ten years' worth of archival data taken from NASA's Chandra X-Ray Observatory.

"I'm very excited about this new grant to continue research," commented DeLaney. "Cas A" is my baby, and this is my project from my brain. It is very cool"

DeLaney, along with a team of astronomers from the National Radio Astronomy Observatory, will spend the next two years continuing to research this supernova remnant. With a partial 3-D computer model already in place from previous research, DeLaney is ready to figure out what causes stars to explode.

DeLaney also sees this as a service to her profession and focuses on what this grant could mean for her students.

"When we have students who work on research projects apply to graduate school, they carry our name wherever they go," said DeLaney, who has a doctorate in Astrophysics from the University of Minnesota. "Whenever we can give students real-world research experience, it is a great thing for everyone involved."

NASA's Chandra X-ray Observatory was launched and deployed into space in 1999 by Space Shuttle Columbia, and it is the most advanced x-ray observatory to date. This observatory is specially designed to observe remnants of exploded stars.

To learn more, contact Dr. DeLaney at Delaney_t@wvwc.edu.

Marshall senior exhibits at **Posters** on the **Hill event** in **D.C.**

Marshall University chemistry major Courtney Hatten of Wayne was recognized this spring for her physical chemistry research at the annual Posters on the Hill event in Washington, D.C. She was the only student chosen from West Virginia.

Hatten, whose faculty advisor is Dr. Laura McCunn, exhibited a poster about the breakdown of a chemical compound exposed to high temperatures in the production of biofuels. Her research was one of 60 projects chosen from more than 700 applications.

"I am very excited to share my research with our nation's leaders and to promote research as a valuable component of undergraduate education," Hatten said. "As an undergraduate researcher, I have had the opportunity to think critically about real problems, conduct experiments to solve these problems and communicate my findings to the public."

Read more at **www.marshall.edu**.

WVU Tech hosts **first Cyber-Physical Systems Symposium**

"Cyber-physical systems will transform the way people interact with engineered systems just as the Internet transformed the way people interact with information," said a presenter at the first Cyber-Physical Systems (CPS) Symposium at West Virginia University Institute of Technology on May 2.

The new WVU Tech Center of Excellence for Cyber-Physical Systems, supported by a West Virginia Research Trust Fund for state colleges and universities grant, hosted the first of what it plans to be annual symposia on CPS in Montgomery.

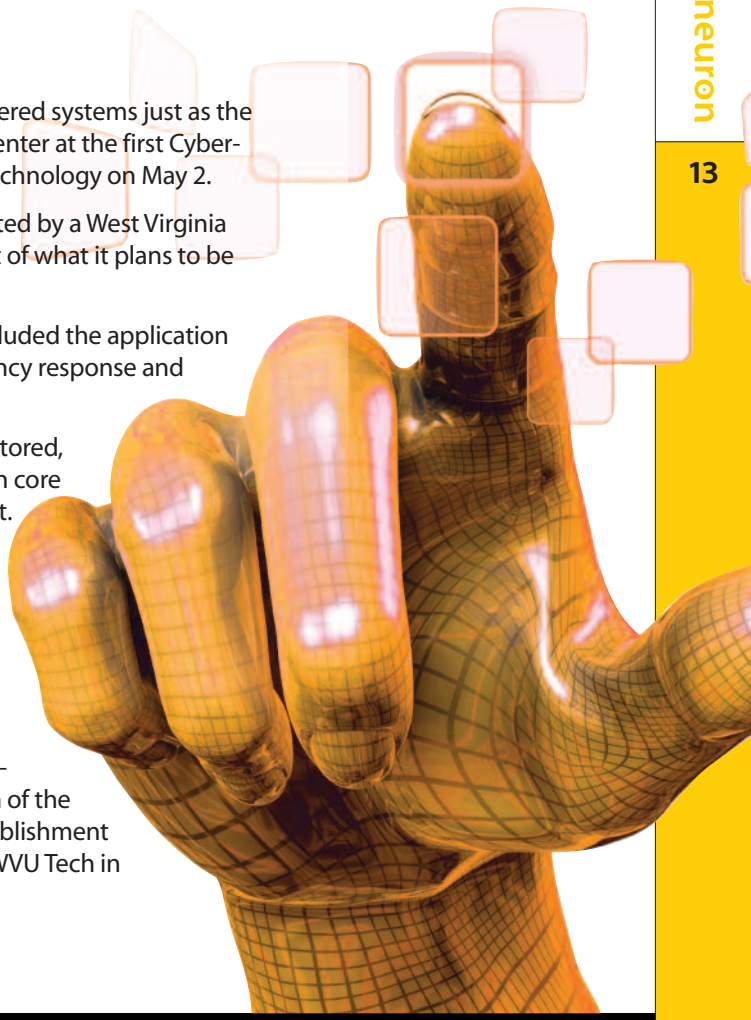
The event featured six leading cyber-physical system researchers. Topics included the application of CPS in smart grids, landslide detection, underground coal mines, emergency response and environmental monitoring.

Cyber-physical systems are engineered systems whose operations are monitored, coordinated, controlled, and integrated by a computing and communication core embedded in all types of objects and structures in the physical environment.

"Emerging CPS will be coordinated, distributed and connected, and must be robust and responsive," explained Dr. Houbing Song, founding director of the CPS center and visiting assistant professor of electrical and computer engineering. "The CPS of tomorrow will need to far exceed the systems of today in capability, adaptability, resiliency, safety, security and usability. CPS will transform the way people interact with engineered systems".

"This symposium is the first step to create a collaborative academy-industry-government program centered around CPS," said Dr. Zeljko "Z" Torbica, dean of the WVU Tech Leonard C. Nelson College of Engineering and Sciences. "The establishment of this center opens the door to opportunities and will increase the role of WVU Tech in technology-based economic development."

See a photo of the Center's introduction here.



E3 INITIATIVES
economy, energy and environment

WVU's **Nimbarte earns EPA grant**

A West Virginia University researcher will be working to help West Virginia manufacturers reduce waste while being more productive and competitive.

Ashish Nimbarte, assistant professor of industrial and management systems engineering, earned a grant from the Environmental Protection Agency to implement source reduction through on-site assessments of industrial facilities. Small- and medium-sized manufacturing facilities in five cities will participate in the project under the auspices of the West Virginia Sustainable Communities.

Nimbarte expects his project to significantly assist the participating facilities by identifying potential sources of human, material, water and energy waste. "E3 initiatives–economy, energy and environment–will be implemented to assist manufacturing firms to improve their financial profitability, environmental integrity and social equity," Nimbarte said.

The successful completion of this project is expected to reduce the usage of electricity, natural gas and water; improve the safety and ergonomics of workplaces; and decrease air pollutants, and hazardous and non-hazardous wastes.

"It is hard to obtain an EPA grant and I commend Dr. Nimbarte for obtaining this important grant," said Bhaskaran Gopalakrishnan, professor of industrial and management systems engineering and director of the Industrial Assessment Center. "This project will use a systems approach to integrate lean, clean and green aspects that will help manufacturing companies overcome multiple sustainability challenges."

Gopalakrishnan and Edward Crowe, representing Industries of the Future-West Virginia, will serve as co-principal investigators. Partners include the West Virginia Manufacturing Extension Partnership, the West Virginia Manufacturing Association and the National Institute for Occupational Safety and Health.

Learn more at **www.wvresearch.org**.

Researchers receive **second patent** for **railroad track inspection system**

Two Marshall University professors have received a second patent for an invention they say will make inspection of railroad tracks safer, more accurate and less expensive than current methods.

Engineering professors Dr. Richard Begley and Dr. Tony Szwilski recently were notified that their Canadian patent application has been approved. It is the first Canadian patent awarded for an invention developed at Marshall. They received a U.S. patent last year.

Their system, which uses a combination of GPS devices, cameras and ground-penetrating radar to measure track wear and other problems, has taken more than 10 years to develop.

Track inspectors currently rely largely on a limited number of multimillion-dollar inspection machines that are available to inspect the tracks only a few times a year.

The researchers say the invention is intended to complement the visual inspections and should help inspectors identify problems faster.

Begley and Szwilski used federal and state funding to produce a prototype of the device, which they field-tested with the railroad industry.

Szwilski said, "We're encouraged because this technological innovation has been "industry pulled" by three major railroad companies keenly interested in applying this technology. We think there's a market."

He and Begley are now working with Marshall's Technology Transfer Office to commercialize the technology.

The researchers say the entire invention process—from the concept to receiving the patent—was enlightening in many ways, and involved assistance of the Technology Transfer Office and the Marshall University Research Corporation.

"It's been fulfilling to me because we've been able to expand Marshall's intellectual property global footprint through the Canadian patent," Begley said. "The Marshall University Research Corporation is a critical piece of the university's research infrastructure and, with the new Weisberg Family Applied Engineering Complex, we'll have our research corporation and our engineering faculty researchers under one roof, helping to produce more success stories like this."

The railroad track inspection system uses "off-the-shelf" components wired together and mounted on a mobile platform that fits snugly on the rail.

Marshall faculty member named top researcher in her field

Dr. Jennifer Mak of the Marshall University School of Kinesiology was recently named the No. 1 leading contributor to research in the discipline of leisure and recreation for the past 20 years.

Top researchers were recognized by the Research Consortium of the American Alliance for Health, Physical Education, Recreation and Dance. Mak was acknowledged as a high-visibility researcher in the 2013 issue of the journal *Measurement in Physical Education and Exercise Science*.

Since August 2000, Mak has been director of sport management and a full professor in the Marshall University School of Kinesiology. In addition to being one of five women recognized, Mak was one of four international scholars identified in the study. As a prolific researcher, she has more than 50 refereed publications and book chapters in highly respected journals across the world.

Commentary

Research universities and the future of America: **Action needed**

By Fred King, Ph.D.
Vice President for Research, West Virginia University

Our country faces challenges on many different fronts, among them security and economic competitiveness.

We faced similar uncertainties a little more than 50 years ago. We were losing our technological lead. Unemployment was high because the skills of many had become obsolete. National security and the national debt were big concerns.

That "greatest generation" decided to invest in the future. It committed to manned exploration of the moon despite the steep costs and deep risks. And the rest, as they say, is history.

Perhaps the value of research and higher education was more obvious then. That generation came of age when university research had made a clear difference in the health, prosperity and security of the world. They understood the value of higher education and research to national security and prosperity because they had seen it.

Unfortunately, questions about the value of higher education and research are being posed by that generation's children and grandchildren.

Although we lead the world in the education of scientists and engineers, we have been less successful in educating others as to the societal value of research. We need to make sure that everyone understands the centrality of higher education and research to our national prosperity and security.

I ask that you -- as a citizen, business leader, or educator – help spread the word about the National Research Council's *"10 breakthrough actions vital to our nation's prosperity and security."*

Federal Action – The federal government should adopt stable and effective policies, practices, and funding for university-performed R&D and graduate education so that the nation will have a stream of new knowledge and educated people to power our future.

State Action – States should provide greater autonomy for public research universities so they may leverage regional strengths to compete strategically and respond with agility to new opportunities.

Strengthen Partnerships with Business – Strengthen the business role in the research partnership, facilitating the transfer of knowledge, ideas, and technology to society, and accelerate "time-to-innovation" in order to achieve our national goals.

Improve University Productivity – Increase university cost-effectiveness and productivity to provide a greater return on investment.

Strategic Investment – Create a Strategic Investment Program that funds initiatives at research universities critical to advancing education and research in areas of key national priority.

Full Federal Funding of Research – Cover the full costs of research projects and other activities they procure from research universities in a consistent and transparent manner.

Reduce Regulatory Burdens – Reduce or eliminate regulations that increase administrative costs, impede research productivity, and deflect creative energy without substantially improving the research environment.

Reform Graduate Education – Improve the capacity of graduate programs to attract talented students by addressing issues such as attrition rates, time-to-degree, funding, and alignment with career opportunities and national interests.

STEM Pathways and Diversity – Secure the full benefits of education for all Americans, including women and underrepresented minorities, in science, mathematics, engineering, and technology.

International Students and Scholars – Ensure that the United States will continue to benefit from the participation of international students and scholars in our research enterprise.

Reach Dr. Fred King at fking@wvu.edu.

Division of Science and Research
West Virginia Higher Education Policy Commission
1018 Kanawha Blvd E Suite 1101
Charleston WV 25301-2800
304.558.4128 X 7
www.wvresearch.org

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FROM THE DIRECTOR:
Lots of outreach

Besides the many articles about academic research in this issue of the *Neuron*, you'll also notice several items about scientific outreach.

From the effort to interest more kids in STEM fields to sharing knowledge about energy, West Virginia's scientific community is increasingly reaching out to involve and educate people about Science, Technology, Engineering and Mathematics.

In April, the Division of Science and Research mailed the first-ever West Virginia edition of *Nanooze* magazine to middle school science classes. Perhaps that *Nanooze* will inspire some 8th graders of today to pursue education and careers in STEM fields, strengthening West Virginia's workforce for the future.

There's also an article about the STEM activities web page. Parents and teachers can find exciting learning opportunities for their kids at **www.wvresearch.org/STEM**.

And while stimulating interest in kids is vital to our state's future, we are not forgetting about the adults. The upcoming STaR Symposium in October, open to everyone, will inform and educate citizens about the energy industry in our state.

The STaR Symposium will feature the first Student Science Video Competition. Undergrad and graduate students are encouraged to submit a three-minute video about their research. We will share those videos online with folks of all ages, providing another great outreach opportunity. Learn more at **www.wvresearch.org/STaR**.

And speaking of outreach, be sure to read and act on the very important commentary on page 15 by Dr. Fred King of West Virginia University.

Thanks for reading. And remember to Reach Out.

Jan R. Taylor

Jan R. Taylor, Ph.D.
Director of Science and Research
West Virginia Higher Education Policy Commission