



IN THIS ISSUE

- 1 From the Desk of the Dean
- 2 College News
- 4 Awarded Grants
- 6 Faculty News



From the Desk of the Dean

No one could have predicted what has happened to us all in the year since the last newsletter; the impact of the COVID-19 Pandemic has touched every one of us in a myriad of different ways.

I am extremely proud, amazed, and heartened at all that the members of the College of Science, Technology, Mathematics, and Engineering have been able to accomplish since the fall of 2019. This newsletter provides a brief overview of the projects, the grants, the publications, and, of course, the successes of our students and graduates. The members of the College of STEM have collaborated across the state, the country, and the world to keep the sciences moving forward. If we can achieve all this in the midst of all that faces us, imagine what we will accomplish once the pandemic burns out. Best wishes to you all, stay safe and well.

Bob Warburton, Ph.D.
Dean



Cecelia Mason

Dr. Robert Warburton
Dean, College of Science, Technology,
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Dr. Jeff Groff Named 2019 Professor of the Year

Dr. Jeff Groff, chair of the Department of Environmental and Physical Sciences, has been named the Faculty Merit Foundation of West Virginia 2019 Professor of the Year. The Foundation made the announcement via letter after its annual spring banquet had to be canceled due to the COVID-19 pandemic.

"This is the highest professional honor of my life, and the honor needs to be shared with my colleagues, family, and friends who supported me, and the students who inspired and challenged me," Groff said. "I'd like to thank the board of the Faculty Merit Foundation of West Virginia for this honor and the work they do to recognize the many outstanding faculty in our state. I'd also like to recognize the other four finalists whose achievements were truly humbling."

Other 2019 finalists included Dr. Tesfaye Belay, professor of biology, Bluefield State College; Dr. Yi Charlie Chen, professor of biology, Alderson Broaddus University; Dr. Peter Ward, professor of anatomy, West Virginia School of Osteopathic Medicine; and Dr. Matthew Zdilla, associate professor of biology and physician assistant studies, West Liberty University.



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Dr. Jeff Groff

Since joining Shepherd's faculty in 2009, Groff has taught lecture and laboratory components of introductory and advanced physics as well as environmental studies courses for both science

and non-science majors. He has been tenured and performing under the associate professor rank since the fall of 2015. (read more) ■

Beta Beta Beta adds trees to Carl F. Bell Arboretum

Members of the Shepherd University chapter of Beta Beta Beta biology honor society have planted native trees and shrubs in the Carl F. Bell Arboretum.

The club planted four shadblow serviceberry and one redbud tree that were purchased at the Monarch Alliance fall plant sale, and two white oak trees from the university's greenhouse.

Those who took part included biology majors Victoria Davis, Martinsburg; Nicole White, Harpers Ferry; Blair Spaid, Yellow Spring; Olamide Adegbamigbe, Lagos, Nigeria; Cheyenne Woicik, Rocky Mount, North Carolina; Tiffany Nguyen, Martinsburg; David Hayes, Shepherdstown; and Andrew Lake, Nicholas Lemon, and Malik Khan, all from Inwood. ■



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Pictured (l. to r.) are biology majors Victoria Davis, Martinsburg; Nicole White, Harpers Ferry; Blair Spaid, Yellow Spring; Olamide Adegbamigbe, Lagos, Nigeria; Cheyenne Woicik, Rocky Mount, North Carolina; Tiffany Nguyen, Martinsburg; David Hayes, Shepherdstown; and Andrew Lake, Nicholas Lemon, and Malik Khan, all from Inwood.

Shepherd Biology Class Measures Benefits of Trees to Campus

Shepherd biology students taking the Plants and Humanity biology class spent part of the fall semester gathering data about trees on campus to calculate the benefits of those trees. Using tree location information from an inventory, students measured the size of the trunks and the distance from buildings and parking lots throughout East Campus. The data gathered give an understanding of the benefits trees provide.

"I really like the idea of this project," said Maya Garcia, a biology major from Shepherdstown. "I think it is a great way for students to learn about how beneficial trees are especially during a climate crisis."

Using a measuring tape, students calculated the Diameter at Breast Height (DBH) of the trees. This data was then put into a website called MyTree, which calculates benefits of the tree



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based on the DBH, starting with total benefits.

"This is crucial to understanding what trees do for us and the surrounding environment," said Dr. Courtney Campany, assistant professor of biology who teaches the class. The larger the tree, the more CO2 it is able to absorb and convert into oxygen. Campany said MyTree

shows the benefits of different gases, water, and energy that are stored and saved by the tree. The energy stored is based on the distance of the tree from a building. Trees provide shade for buildings which saves energy for heating and cooling. Trees help take in greenhouse gases and store them to prevent further emission. (read more) ■



Dr. Jason Best

Dr. Jason Best has been promoted to assistant provost for distance education and strategic research initiatives at Shepherd University,

Dr. Best Promoted to Assistant Provost for Distance Education and Strategic Research Initiatives

effective July 1. Best reports to the provost and serves as a member of the Deans Council.

"The promotion of Dr. Best represents recognition of his work on strategic initiatives like student and faculty research placements and events, as well as the important compliance element of accreditation with Shepherd's regional accrediting body, the Higher Learning Commission," said Provost Scott Beard. "With Shepherd's recent approval to offer distance education, Dr. Best will continue to assist in strategically expanding these offerings to new locations and populations of students."

Best is a professor of astronomy and astrophysics and the director of the Shepherd University Observatory. A member of the Shepherd University faculty since 1997, he earned a Bachelor of Science degree from Indiana University and a Ph.D. from The Pennsylvania State University. He has served on the national Council on Undergraduate Research's Task Force on Integrating Research into the Curriculum and on the National

Advisory Committee for the PRAXIS Earth and Space Sciences Examination, and as president of the West Virginia Academy of Science, a member of the Shepherd University Board of Governors, and president of the university Faculty Senate.

He was a member of the 2015-2016 American Council on Education Fellows Class, focusing his fellowship project on research efforts at primarily undergraduate institutions. Best was recently appointed to the Higher Learning Commission's Peer Review Corps, and currently serves on the Shepherd University Foundation as both a board member and member of the Executive Committee. He chairs the university Institutional Review Board, and serves as Shepherd's accreditation liaison officer. As part of a multiyear National Science Foundation-funded grant beginning in 2015, Dr. Best established the Shepherd hub of the Pulsar Search Collaboratory, an initiative designed to remotely teach high-school students across the nation to conduct research on data obtained by the Green Bank Telescope. (read more) ■

Awarded Grants

Town Run Monitoring Station Installed with \$6,700 Grant from Town of Shepherdstown

Shepherd University's Department of Environmental and Physical Sciences is using a \$6,700 grant from the Corporation of Shepherdstown to monitor water quality in the Town Run.

Dr. Jeff Groff, department chair, and Dr. Peter Vila, associate professor of environmental and physical sciences, have installed a monitoring station on the creek that will show water and discharge levels and will measure oxygen, pH, temperature, and conductivity. The station is solar powered and will upload the data to the web using Wi-Fi.

"We will make the data available in real time for people to view," Groff said. "There will be a web application that will show current conditions and historical trends."

"It is nice people can sense what's happening in their watershed and have an appreciation for the water quality and the impacts that certain aspects may have on the water quality such as rain and discharge," Vila said. "It's good to know the background water characteristics, the quantities, and the chemical nature of the water."

The Potomac River is Shepherdstown's primary water source and the Town Run is its secondary water source, so the new monitoring station will



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Pictured (from l. to r) are Dr. Jeff Groff and Dr. Peter Vila

benefit both the town and the university.

"Shepherdstown is delighted to be a partner in this project that shows the value of a positive town-gown relationship," said Jim Auxer, Shepherdstown mayor. "The daily information gained from the monitoring system of our secondary water source has proven to be invaluable in improving water quality."

"Monitoring the Town Run will provide data regarding the seasonal and long-term changes

in quantity and quality that occur with this critical resource and will facilitate strategic planning regarding the current and future use of the Town Run as a drinking water source," Vila said.

The grant covers cost of the equipment and a stipend for a student to help with the project. The monitoring station will also benefit students in several classes, such as Stream Ecology, Hydrology, Applications of Electronic Monitoring, and Physical Computing. ■

Warburton, Miller Awarded \$100K National Science Foundation Planning Grant

The National Science Foundation has awarded a one-year \$99,999 planning grant to Shepherd University to develop a comprehensive plan to cost effectively connect the university to the Internet2 national backbone.

"This planning grant will support Shepherd's exploration of the feasibility to connect to Internet2," said Dr. Robert Warburton, dean, College of Science, Technology, Engineering, and Mathematics. "We are confident of a positive outcome and that by taking advantage of the potential 100 times faster data connection we will be able to enhance multiple degree

programs at Shepherd and across the region."

Internet2, a not-for-profit consortium devoted to building the next generation of internet based on fiber optics, was founded by the nation's leading higher education institutions in 1996. It is made up of universities, corporations, and governments from the United States and more than 100 other countries, and serves 317 U.S. universities, 60 government agencies, and 43 regional and state education networks.

Universities that are part of Internet2 include University of Maryland, Carnegie Mellon University, Penn State, Virginia Tech, George

Washington University, and West Virginia University. Jason Miller, assistant professor of computer information science, said for Shepherd to join Internet2, it would require an optical fiber connection from campus to some already-connected institution.

"Given our placement between rivers, mountains, and state lines, we're not sure this is even feasible," Miller said. "Staying connected would involve monthly fees over and above what Shepherd already pays for its regular internet connection. Before we start digging trenches, we want to make sure the project would be sustainable." (read more) ■



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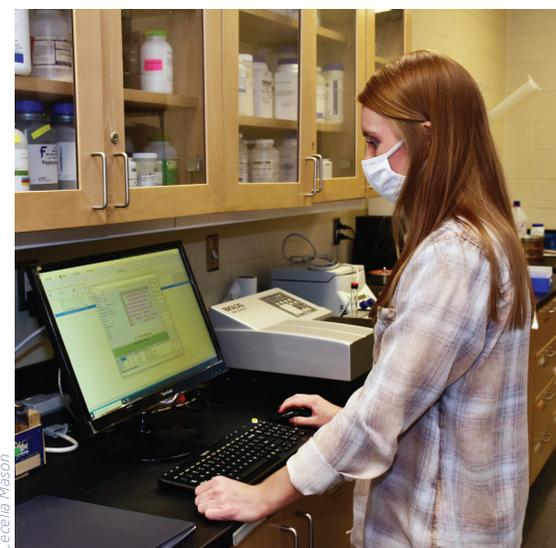
Dr. Jacquelyn Cole, Chair, Department of Chemistry

One of two Shepherd Learning Project WISH grants was awarded to the **Department of Chemistry** in the amount of \$35,375 to be used for a much-needed upgrade to the outdated lab equipment currently being used. Because technology, particularly instrumentation, changes at such a rapid pace, new state-of-the-art equipment is needed in the teaching labs to better prepare Shepherd students for direct entry into the workplace or graduate/professional school. "The chemistry department is so grateful to WISH for this funding opportunity for student laboratory instruments which will be used to train future scientists now and for years to come," said **Dr. Jacquelyn Cole**, department chair. "In chemistry, there is a gender gap between women and men, especially beyond the bachelor's level where men earn around twice as many graduate degrees than women. I am excited that students will see the women of Shepherd investing in their education and hope it will inspire them to help fund the future." ■

Dr. Laura Robertson, principal investigator, awarded **West Virginia EPSCoR Instrumentation Grant, Acquisition of a Biolog GEN III MicroStation** to facilitate rapid biochemical identification and characterization of bacteria and filamentous fungi in undergraduate research and education. Award amount: \$20,000 (Instrumentation grant awarded 11-25-19). Biolog GEN III MicroStation and associated databases and software (total cost \$43,195) were purchased in December 2019 using EPSCoR Instrumentation Grant award and funds raised by the Shepherd University Foundation to support the Paul Saab Memorial Lab. The Paul Saab Memorial Lab continues to accept donations in memory of the late Paul Saab, who was a dedicated

and beloved biology professor at Shepherd for 37 years until his passing in 2001. He touched the lives of many students during his tenure at Shepherd, and he could be found volunteering and working with many student groups including as Director of Elderhostel, Coordinator of Culinary Arts, Advisor of Sigma Sigma Sigma sorority and Theta Xi fraternity. The memorial lab is currently used to teach microbiology, a required course by nursing majors and an elective for biology, biochemistry, and environmental studies majors. For more information, please contact Sherri Janelle, Executive Director of Development at the Shepherd University Foundation at 304.876.5043 or sjanelle@shepherd.edu. ■

RIGHT: Allison Beverlin using new biolab equipment



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Dr. Jason Best and his research students continued to be part of an ongoing **\$20 million National Science Foundation grant**. The NSF grant established a team of researchers,

consisting of astrophysicists and engineers from across the state, who are building the physical and human infrastructure in West Virginia necessary for researchers to directly detect and characterize gravitational waves. Research on gravitational wave detection takes advantage of the Robert C. Byrd Green Bank Telescope in Green Bank. The project broadens participation of minorities and females in STEM professions through continuing education workshops and scholarships. Public engagement occurs through citizen science efforts, as well as museum and planetarium displays and programs ■

Cecilia Melton and Jacqui Cole, WV Science and Technology Instrumentation Grant, \$20,000. Supercritical Fluid Extraction System for the Research and Application of Botanical Compounds. ■

Cecilia Melton, Jacqui Cole, Sytil Murphy, Court Campany, and Kay Dartt. Two Rivers Giving Circle Grant for Seeding Your Future, \$2,100. ■



Dr. Courtney Company Receives \$60K in Grants to Purchase Research-Grade Equipment

Students at Shepherd University will have more opportunities to participate in plant biology research thanks to two grants totaling about \$60,000 awarded to Dr. Courtney Company, assistant professor of biology.

Company received a \$30,852 LI-COR Environmental Educational Fund (LEEF) grant from LI-COR Biosciences and a \$29,723 instrumentation grant from West Virginia Science and Research, a division of the West Virginia Higher Education Policy Commission. The LEEF grant is in the form of a price reduction for a research-grade portable instrumentation system that can measure photosynthesis, the process in which plants and some other organisms use sunlight to synthesize foods from carbon dioxide and water.

"This instrument will vastly increase the student learning experience by providing hands-on, processed-based exploration of photosynthesis," Company said. "We also welcome a new avenue for undergraduate students to explore research in plant biology, global change, ecology, and agricultural sciences across STEM disciplines."

Company said the equipment will allow for new student-led research that will cover natural and experimental investigations in Shepherd's greenhouse, in natural environments, and with crop plants at Shepherd's Agricultural Innovation Center at Tabler Farm.

"This piece of equipment is fundamental to my research program," Company said. "It will provide the opportunity to drive innovative student research in plant biology for years to come." ■



Dr. Courtney Company

Faculty News

PUBLICATIONS

Dr. Court Company Assistant Professor, Biology

- Canopy position affects photosynthesis and anatomy in mature Eucalyptus trees in elevated CO₂. —K.Y. Crous, C. Company, R. Lopez, F.J. Cano, D.S. Ellsworth. *Tree Physiology*, 2020
- Insights into the evolutionary history and widespread occurrence of antheridiogen systems in ferns. —O. Hornyk, W.L. Testo, E.B. Sessa, J.E. Watkins Jr, C. Company. *New Phytologist*, 2020
- TRY plant trait database-enhanced coverage and open access. —J. Kattge, G. Bönisch, S. Díaz, S. Lavorel, I.C. Prentice, P. Leadley, ... C. Company. *Global change biology* 26 (1), 119-188
- Whole-tree mesophyll conductance reconciles isotopic and gas-exchange estimates of water-use efficiency. —Gimeno, Teresa; Company, Courtney; Drake, John; Barton, Craig; Tjoelker, Mark; Ubierna, Nerea, Marshall, John. Accepted for publication in *New Phytologist*

Dr. Mohammed Ghahremani Associate Professor, Computer and Information Sciences

- Hysteresis loss reduction and magnetocaloric effect improvement in the Ni-Co-Mn-In alloys. —AIP Advances, <https://aip.scitation.org/doi/10.1063/1.5130440>

- Martensitic Transformation and Magnetocaloric Effect in Co-doped Ni-Mn-In Ferromagnetic Shape Memory Alloy —A. Aslani, M. Ghahremani and L. H. Bennett, *IEEE Transactions on Magnetics*

Dr. Conor Sipe Assistant Professor, Biology

- Dilp-2-mediated PI3-kinase activation coordinates reactivation of quiescent neuroblasts with growth of their glial stem cell niche. —PLOS Biology, <https://doi.org/10.1371/journal.pbio.3000721>
- Dilp-2-mediated PI3-kinase activation coordinates reactivation of quiescent neuroblasts with growth of their glial stem cell niche. —Yuan, X., Sipe, C., Suzawa, M., Bland, M. and Siegrist, S. *PLoS Biology*, 2020 May 28;18(5):e3000721. doi: 10.1371/journal.pbio.3000721

Dr. John Steffen Assistant Professor, Biology

- Publication with student, Logan Rothstein, titled Influences of Husbandry on Coloration of Turtles. —*Radiata* 29 (1), 2020.
- The effect of dietary carotenoid increase on painted turtle spot and stripe color. —John E. Steffen, Jessica Hultberg, Stephen Drozda. *Comparative Biochemistry and Physiology, Part B* 229 (2019) 10-17
- Publication with some non-Shepherd

students Steffen, J.E., A. Agato*, I. Radhi*, V. Stepanyan* and C. Bush*. No preference for more colorful or showier males among female brown anoles. —*Journal of Alabama Academy of Sciences*, 90(2): 70-78

Dr. Weidong Liao Professor, Computer and Information Sciences

- Poster abstract as published in Proceedings of CCSC Eastern's 36th Annual Regional Conference (CCSC-EA 2020) —*A Multi-Cloud Environment for Teaching Relational Database Services*
- Publication with Dr. Osman Guzide, Computer and Information Sciences: Poster abstract as published in Proceedings of CCSC Eastern's 36th Annual Regional Conference (CCSC-EA 2020) —*Low-Code/No-Code Software Development Platforms and their Uses in Computer Science and Information Technology Education*

Dr. Sher Hendrickson-Lambert Professor, Computer and Information Sciences

- Mapping of Diabetes Susceptibility Loci in a Domestic Cat Breed with an Unusually High Incidence of Diabetes Mellitus. —Balmer, L., C.A.O., Leary, M. Menotti-Raymond, V.A. David, S. J.O. Brien, B. Penglis, S. Hendrickson, M. Reeves-Johnson, S. Gottlieb, L. Fleeman, D. Vankan, J. Rand, and G. Morahan. 2020. *Genes (Basel)*, 1-11



HIGHLIGHTS

- Reviewer, National Science Foundation: In winter 2020, **Dr. Jason Best** served as a reviewer for the National Science Foundation. NSF reviewers evaluate the merit of eligible applicants by applying the National Science Board (NSB)-approved merit review criteria of Intellectual Merit and Broader Impacts, and recommend individuals for NSF Awards. Applications are reviewed in disciplinary and interdisciplinary panels based on the applicant's selected field of study.
- Reviewer, Council on Undergraduate Research: In fall 2019, **Dr. Jason Best** served as a reviewer of undergraduate research posters for the national Council on Undergraduate Research's Posters on the Hill event. At this annual event on Capitol Hill in Washington, D.C., members of Congress and their staff members learn about the importance of undergraduate research through talking directly with the student researchers involved in these programs. CUR reviewers across the country evaluate undergraduate posters in order to determine which posters will be included in the event.
- Featured Scientist, Statewide Scientist Spotlight Video Series: In fall 2019, **Dr. Jason Best** was featured in West Virginia Science and Research's statewide Scientist Spotlight Video Series. He discussed his research into the large-scale structure of the universe, how his research informs the classes he teaches, the return on investment to the public for its funding of basic and applied scientific research, the importance of broadening access to the scientific enterprise, and how the ability to think across the numerous length scales and time scales in astrophysics provides benefits to both scientists and nonscientists alike.
- **Dr. Dan DiLella**, Professor of Chemistry and Department Chair, retired after 25+ years of service and was named as an emeritus faculty member.
- New Hires: **Dr. Sebastian Donner**, Assistant Professor of Chemistry, and **Dr. Amjad Hossain**, Assistant Professor of Computer Information Systems.
- **Dr. Sher Hendrickson**, Associate Professor in Biology and Research Associate at the Center for Conservation and Evolutionary Genetics, Smithsonian Institute, while on fall sabbatical leave is conducting research to support the Andean Condor Conservation Program (PCCA: Programa de Conservación Cóndor Andino) in Argentina. Dr. Hendrickson first began working with PCCA director Luis Jacome in 1996, not long after he initiated a program for captive-breeding and puppet rearing Andean condor chicks at the Buenos Aires Zoo. To date, PCCA has successfully captive-bred 70 chicks, reintroduced 197 condors in South America and been involved in the rescue and rehabilitation 350 wild condors.
- **Dr. Jeff Groff** gave an invited talk titled "Deep Learning for a Deeper Understanding of Physics" at the January 2020 meeting of the American Association of Physics Teachers in Orlando, Florida. Deep learning is a specialized area of machine learning capable of generating predictive models. The presentation focused on comparing the physicist's approach to building and using predictive models to the deep learning approach.
- **Jason Miller** attended the IEEE BIBM conference, San Diego, California, in November 2019 where he submitted a research paper.
- **Jason Miller** contributed to the scientific peer review process by reviewing articles for three scientific journals: *Genes*; *Genomics*; and *Process*.
- **Jason Miller** is serving as program committee member for the 12th International Conference on Bioinformatics (BIOSTEC 2021). The committee is charged with selecting which paper submissions warrant a speaker slot at the conference.
- **Dr. Ed Snyder**, a faculty member at Shepherd since 1986, will be retiring in December 2020. Dr. Snyder led efforts to develop the environmental studies program in 1994 and to expand the program to a major in 1997. Dr. Snyder was a recipient of the Professor of the Year award in 2010.

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