

# STEM EDITORIAL

WVUCE-STEM Newsletter

Volume 1, Issue 1

## About the Center

### Faculty Improving STEM Education

In keeping with WVU's strategic goal of excellence in research and innovation, five Mountains of Excellence that represent multidisciplinary areas of strength and opportunity were created.

Four colleges, (Benjamin M. Statler College of Engineering and Mineral Resources, College of Education and Human Resources, Eberly College of Arts and Sciences, and Davis College of Agriculture, Natural Resources and Design), together with the Provost, initiated a strategic plan focused on the cluster hire of faculty into STEM education research, one of the five Mountains of Excellence. The WVU Center for Excellence in STEM Education (WVUCE-STEM) was founded in 2015 as a result of this initiative to become a leader in STEM Education Research.

WVUCE-STEM has, as part of its core strategic mission, the integration of STEM education research initiatives on the WVU campus. Such initiatives are designed to improve STEM education at an institutional level, influencing education in all core STEM departments, supporting STEM faculty in developing familiarity with research-based teaching practices, and to build partnerships with other institutions to further our goals. This mission goes beyond the campus. Overall WVUCE-STEM seeks to develop and deliver a coherent array of scholarly, teaching and outreach activities that build success in STEM learning, K-20. The work to date has focused on three major tracks (1) preparation of secondary STEM teachers; (2) success of undergraduate students in STEM courses (note that success covers everything from recruitment through graduation); and (3) K-12 STEM education in West Virginia

WVUCE-STEM is led by Dr. Gay Stewart, Director of the WVUCE-STEM and Eberly Professor of STEM Education, former president of the American Association of Physics Teachers, member of the Board of Directors of the American Physical Society, and co-chair of the College Board's redesign of algebra-based AP Physics and coauthor of their Grades 6-12 *Science Standards for College Success*.

## What's Inside:

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## ***Giving WVU a national voice in STEM Education***

WVUCE-STEM represents WVU and the state of West Virginia in **STEMx**, a multi-state STEM network developed to provide an accessible platform to share, analyze and disseminate quality STEM education tools to transform education, expand the number of STEM teachers, increase student achievement in STEM and grow tomorrow's innovators.

WVUCE-STEM also represents WVU in **100Kin10**, a networked effort of 250+ partners working to support STEM educators and to train 100,000 excellent new STEM teachers by 2021.

## **Notes from the Director**



Welcome to the first issue of the WVUCE-STEM newsletter!

The 2016-2017 academic year has been a busy and productive year so far! The fall semester has already come and gone and with it WVUCE-STEM entered its second year of serving West Virginia University and over 60 Affiliate Faculty.

WVUCE-STEM has already supported the submission of 14 grant proposals this academic year, and we are currently working on several more collab-

orative proposals this spring. Overall, WVUCE-STEM has submitted 40 proposals, and has had 10 of those proposals funded, with 15 still pending.

As we roll into the spring semester, I would like to take this opportunity to thank everyone who has submitted research proposals through the Center. We are excited to go beyond purely STEM education-focused proposals to aiding STEM faculty in strengthening the broader impacts of their research proposals to support STEM education in West Virginia.

I wish all of you a successful spring semester, and we, WVUCE-STEM, look forward to continue to work and partner with you.

Kindest Regards,

A handwritten signature in black ink that reads "Gay Stewart".

**Gay Stewart**  
Director, WVU Center for Excellence in STEM Education  
Eberly Professor of STEM Education and Professor of Physics



*UT Austin, where UTeach was created, sent Bevo, the UT Austin mascot, a stuffed longhorn, around to the student organizations at every UTeach program. While Bevo toured WVU, WVUteach students took a photo with Bevo and the WVU Mountaineer.*

*Photo taken at the WVUteach House: November 2016*

## In The News

### WVUteach Program Update

WVUteach is going into its third year. This spring, the program officially accepted the first group of students into the preservice licensure program.

Three new course offerings have been added to the existing course offerings this year, bringing the total WVUteach course count to five:

- UTCH 221: Knowing and Learning (Fall 2016)
- UTCH 222: Classroom Interactions in Math and Science (Spring 2017)
- BIOL/CHEM/PHYS 376: Research Methods (Spring 2017)

University of Texas at Austin (UT Austin) founded the UTeach program. WVUteach is one of 44 UTeach replication sites at universities nationwide. To help UTeach celebrate its 20th anniversary in 2017, these universities will be raising awareness of the importance of high-quality secondary STEM education with a variety of celebratory activities. Two of these activities are the “Where’s Bevo?” contest, in which WVUteach has already participated (as demonstrated in the photo above), and the celebration of National Teacher Appreciation Week. During this week, May 1-5, 2017, a WVUteach future teacher and WVU President Gee will be going into a local school in Morgantown to teach a STEM lesson.

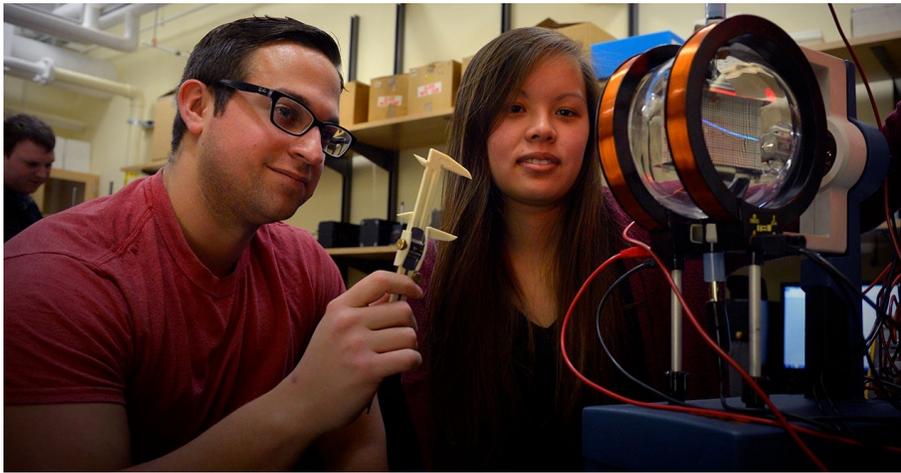


*Photo taken from <https://uteach.utexas.edu/uteach-blog/students-uteach-graduates-learn-more>*

### **Students of UTeach graduates learn more**

In a recent [UTeach blog](#) by Michael Marder, Executive Director of UTeach, it was announced that a study examining the difference in student outcomes of university-prepared and alternatively certified teachers showed students of university-prepared teachers, such as UTeach graduates, gain at least one more month of schooling each year than comparable alternatively certified teachers.

The study found “a significant advantage of around 9 months of schooling in both Algebra I and Biology for Gifted students, and 5 months of schooling in Biology for Economically Disadvantaged and Hispanic students.”



## PhysTEC Program Update

The PhysTEC program at WVU is directly partnering with WVUteach. High school physics teachers are some of the most sought after teachers, and the smallest number produced nationally. Institutions producing 5 or more physics teachers in a year receive national recognition! With a grant from the American Physical Society and the National Science Foundation starting in the fall of 2015, WVU physics faculty member John Stewart, working with the WVUteach Co-directors, physics faculty member Paul Miller and PhysTEC Teacher In Residence Michael Tilley, has been leading the effort to recruit and prepare these rare teachers.

In the last 1.5 decades, WVU has produced only two high school physics teachers. WVUteach provides a path to licensure that can be completed in four years. The introductory physics courses are being revised to provide an even stronger educational experience, advising of future teachers is being improved and degree plans that allow more flexibility to take courses that enhance teacher understanding are in the approval chain. *Currently there are nine potential physics teachers in the pipeline, with three on track to finish in 2018!*

## Nationwide STEM News

- On January 25, 2017, the Association for Career & Technical Education (ACTE) released their new [report on 2016 State CTE Policies](#). In this report, West Virginia's A-F school grading system, which was adopted in June 2016, was featured.
- On January 18, 2017, the U.S. Department of Education (DOE) released a [Guide to STEM Funding Through ESSA](#) (Every Student Succeeds Act).
- On January 10, 2017, 100Kin10 released their [2016 Trends Report](#).
- In January 2017, Education Week released the 21st edition of [Quality Counts 2017: State Highlights Report](#). This long-standing annual report compares individual state data to national data.
- On December 16, 2016, 100Kin10 launched a new website in response to the U.S. DOE's ESSA called ["Every Student Succeeds with STEM."](#) The aim is "to ensure that state and local implementation plans include a priority on STEM teaching and learning."

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## **\*Continued Nationwide STEM News**

- On December 12, 2016, the STEM Education Coalition sent an [ESSA Letter](#) to state policymakers across the nation outlining their recommendations for state-level implementation of ESSA.
- The U.S. DOE on Wednesday, December 7, 2016, released two Notices of Final Regulations (NFRs) that implement provisions of Title I of the ESSA. More information on these NFRs can be found online at the [U.S. DOE's website](#).
- The STEM Education Coalition in November 2016 released their Recommendations to then President-Elect Donald J. Trump and the Transition Team entitled: ["STEM Education, Good Jobs and American Prosperity."](#)



*Photo of Dr. Withers taken from wvutoday article "A Year of WVU Women in STEM: Teaching science for life"*

## **Faculty Member Spotlight**

### **Dr. Michelle Withers**

I'm Michelle Withers, an education researcher in the Department of Biology here at WVU. I've been involved in STEM education research and reform for over a decade. I trained as a neurobiologist, but as a result of my participation in the National Academies Summer Institutes on Undergraduate Biology Education, I transitioned into education research. When I attended the Summer Institute back in 2004, I didn't know the difference between summative and formative assessment. I was teaching the way I had been taught, using passive lecture, and wondering why my students were bored and failing to learn the course material.

The Summer Institute provided an utterly eye-opening experience for me. I was prompted to take a scientist's view of the classroom: using evidence to guide my decisions about how to teach and collecting data to determine if my approach was effective. It was as if I had been blundering in the dark and someone switched on the lights. Since then, I've been implementing active, student-centered strategies in my classroom and helping other STEM faculty to do the same. My research program revolves around those two different realms - evaluating strategies to improve student learning and to increase adoption of evidence-based practices by STEM faculty.

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## State STEM News

- On [January 11, 2017](#), The West Virginia Board of Education (BOE) decided unanimously to put out for public comment [a policy](#) that would shift standardized tests for all public high schools from Smarter Balanced to end-of-course exams.
- On January 9, 2017, The Education Alliance released the [Comprehensive Analysis of Summative Assessments \(CASA\)](#) report.
- In a [December 2016 Special Report](#), a West Virginia Legislative Auditor found that as extensions of the State BOE, Regional Education Service Agencies (RESAs) represented “an unnecessary and costly organizational layer between the DOE and County BOEs” and therefore made the recommendation to the State to eliminate RESAs.
- November 30th was declared STEM day in West Virginia by [Governor Earl Ray Tomblin](#).
- West Virginia DOE released its latest [School Report Cards](#) on November 16, 2016.

## *\*Continued Faculty Member Spotlight*

Although the system is beginning to change, it is still more common for students to graduate from doctoral programs without formal pedagogical training and for STEM faculty to teach using primarily lecture methods. With funding from the National Science Foundation, I’ve been working to extend the impact of the Summer Institutes. I developed the first regional Summer Institute to reach beyond Biology faculty at research universities to encompass current and future STEM faculty from any post-secondary institution. Based on its success, four to six regional Summer Institutes per year have been offered across the country since 2012 and have helped train nearly 2000 STEM faculty. Paradoxically, one of the biggest barriers to educational reform comes from institutional policies that discourage time spent on transforming one’s approach to teaching. Currently, I am evaluating an adapted version of the Summer Institute format that addresses the dual needs for pedagogical training and organizational change to support faculty who are attempting to adopt evidence-based practices.

Finally, I am passionate about improving student learning and success, especially in large-enrollment introductory courses where many STEM undergraduates fail. I’ve found that rethinking the way I view failure and assessment can be very beneficial for students. We tell students that failure is part of learning and yet, when a student masters material by the end of class that they failed earlier in the semester, the early failures are not erased. If students achieve mastery of course skills and concepts by the end of class, why do we care if they needed different amounts of time or effort to get there? Use of a combination of mastery-based testing and proficiency-based grading has greatly improved student performance in my introductory biology class by allowing students to both learn and recover from their failures without being punished for them. I count myself very lucky that my career allows me to combine my passion for teaching and research in ways that improve both.

## Did You Know?

The WVU Center for Excellence in STEM Education provides a variety of resources to support faculty in their STEM education research efforts and to enhance the broader impacts their STEM research can have on education in West Virginia.

We offer the following benefits to all STEM Education Research Network faculty members:

- Upcoming STEM Education proposal announcement notifications via the STEM Education Research Network email listserv
- Research collaboration opportunities with other faculty members of the STEM Education Research Network
- On-going opportunities to network and learn about what others are doing through the WVUCE-STEM Colloquium Speaker Series

In addition, we offer the following benefits to those STEM Education Research Network faculty members who submit STEM education grants through the Center:

- Support in proposal writing and development (We also support STEM research faculty who wish to collaborate through WVUCE-STEM to maximize their broader impacts)
- Program review, including external advisors available through WVUCE-STEM and assisting in managing the external advisory/review process
- Project management expertise and resources\*
- Additional post-award support\*
- Assist faculty in programmatic dissemination of their research findings
- Social Science Research support to aid in experimental design and evaluation\*

\*Evaluated on a proposal-by-proposal basis.

Existing STEM Education Research Network members wishing to take advantage of any of the benefits listed above should email [stem.center@mail.wvu.edu](mailto:stem.center@mail.wvu.edu) with your specific benefit request.

New faculty wishing to become affiliated with the Center should visit: <http://stemcenter.wvu.edu>, and click on the “Join our STEM Education Research Network” link on the right-hand side of the page.

## Contact Us

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