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## Spring 2015 e-CERTI Newsletter

Center for Educational Research and Teaching Innovation

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*Hello S&T Instructors –It’s the messy month of March at Missouri S&T, where recess and spring break can wreak havoc with instructor’s teaching schedules. In this issue, we feature several faculty who have made the most of their time with their students in the classroom and lab, and have the accolades to prove it, including Melanie Mormile, Ralph Flori and Bill Gillis. Read on ...*



**CERTI  
NEWSLETTER**  
Center for Educational  
Research and Teaching  
Innovation at Missouri S&T

It’s GIVE and take in

## Melanie Mormile’s Balancing Act



Sam O’Keefe photos

Melanie Mormile’s initials notwithstanding (her middle name starts with an “R,” not an “O”), she has a long history of investing in other people’s success, serving as mentor to students and younger colleagues, and giving back from the wealth of her own educational journey.

It was not the rosiest start for the award-winning Missouri S&T professor of biological sciences, though. After changing her major from chemical engineering to chemistry as an undergraduate at the University of Cincinnati, she was shocked when her chemistry professor told his students on the first day of class, “I really resent having to teach this class. I’m going to try to flunk as many of you as I can.”

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## Give Us Your Suggestions

Is there an instructor you would like to see featured in the CERTI newsletter? What about a teaching technique that you have found to be helpful? Email your ideas to [Diane Hagni](#) for consideration for future newsletter issues.

He flunked 52 percent of the class that quarter, including Mormile, who had no idea at the time that she would make academia her career. Still, she knew that the attitude of “you students are getting in the way of my important research” was the wrong mindset for an educator. A thought was forming in her head about being able to balance both research and teaching while being successful at both.

She would be the first to admit that her own attempts at balance have not always been perfect, especially when the element of family is thrown into the mix, however, her accomplishments speak for themselves. Mormile earned the status of associate professor five years into her career and full professor after six more years, garnering five faculty excellence awards along the way, as well as several Outstanding Professor Awards and Excellence in Teaching Awards. She has published 33 peer-reviewed articles, two book chapters and five proceedings articles, and she holds two patents.

In 2008, she was named S&T Woman of the Year. She has been happily married to her husband, Michael Gueterman, for the past 29 years. The couple has two grown sons, who sometimes reminded their busy mom when they were growing up, “Remember, we’re your *real* kids!”



#### Wise advisor

Flexibility has been as important as balance in Mormile’s accomplishments, dating back to her rude awakening in that undergraduate chemistry class. Her switch to biology brought about a passion for the subject as well as for undergraduate research, and a burgeoning desire to be a professor. She obtained her first degree while working her way through school on a student work appointment with the EPA laboratories across the street. She is still friends with her caring undergraduate advisor who recommended that she apply to the EPA, enabling her to continue her schooling.

A first-generation college student and Cincinnati native, Mormile decided to pursue additional degrees and would have been content to stay where she was. Again, though, her advisor stepped in with wise counsel. Seeing her potential, he urged her to apply further from home and told her he would tear up any application that she made to graduate school at her current institution. She ended up going to the University of Louisville, 100 miles away, which was a substantial move, she joked, “for a kid, who, going to the Cincinnati Zoo was a big deal!”

She focused on microbiology in Louisville and then went on to Norman, Okla., for her Ph.D. Her post doc work was done at the Pacific Northwest National Lab in Richland, Wash., where she was able to do cutting-edge research at Soap Lake on halophilic bacteria. Her graduate and post-doc work is still being cited 26 years later. Her research from Soap Lake recently was in the news regarding a discovery of a bacterium that can produce hydrogen, which has the potential of lessening the world’s dependence on oil in the future.

#### Choosing S&T

When Mormile looked for an institution to begin her academic career in 1999 after her post doc work, she knew excellence in teaching was going to be a non-negotiable.

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## Teaching and Learning Grant Programs for 2015-2016

Are you interested in improving or redesigning your course through a teaching and learning grant?

The campus is offering two grant programs for 2015-2016.

CERTI is sponsoring an educational research grant program for instructors who want to research an educational intervention in their classrooms.

A letter of intent is due to the CERTI office by March 30 and the full proposal is due April 24.

For more information, including a PowerPoint presentation about the program, go to the [CERTI website](#) or contact [Diane Hagni](#).

The educational technology office is sponsoring eFellows grants for course re-design for blended or online learning. There are three tiers of funding available.

A letter of intent is due April 24 and the full proposal is due on June 12.

For more information about the eFellows program, go [here](#) for a PowerPoint presentation or contact [Angie Hammons](#).

She found that emphasis in the S&T biological sciences department as well as the attractive prospect of developing a brand new master's program. Mormile worked with Paula Lutz, Dave Westenberg and Marshal Porterfield, as well as the rest of the biological sciences department, to develop a proposal for this program.

### Care = impact

Mormile has a simple answer as to why she has received consistently high course evaluation scores from students throughout the years: "I care!" As she found life becoming busier moving through the professorial ranks, one of the things she vowed was to focus more on what students needed to get out of her classes. Her teaching philosophy was developed as a GTA in Louisville, where she stressed to students the importance of focusing on the big concepts and not as much memorization of each small detail. "Essentially, I'm providing them with the tools and ideas they need to be successful," she said. "I try to remember that I'm really impacting this group of people."

She has taught Introduction to Biological Sciences for the freshmen of the department, assisting growing numbers of students each year with foundational tools, such as building a resume and writing a personal statement, or figuring out where they want to focus on for their careers.

Mormile has mentored 16 OURE (Opportunities for Undergraduate Research Experience) students over the past seven years, and currently mentors two OURE students and one graduate student. Several others are volunteers and subsequently apply for their own OURE projects. Like those who mentored her, she stays in contact with many of her former students.

### Amazing job

Recently Mormile was appointed as special assistant to the provost for faculty affairs, where she will assist with faculty awards, workload development, promotion and tenure, and other faculty issues. This position is a natural, as she has been involved previously with the campus' promotion and tenure committee and helped younger faculty with questions about their dossiers and how they can improve their teaching and course evaluations.

When encouraging younger colleagues in the assistant professor stage, her advice is "they can't be 100 percent at everything at the same time." She says that there will be certain times that they will need to be extremely focused on a particular project for a period of time, such as getting a research proposal together, but then it is equally important to pull away and take time for family or other interests.

Mormile's other interests include hiking, visiting state parks and cross-stitching, the latter very sparingly due to time constraints. Her husband recently bought her a new bike, so she would like to have opportunities for the two of them to bike more of the Katy Trail. Don't expect her to quit her day job anytime soon, though. "This is an amazing job!" she says with a broad smile. "It's really good here. It's the people who make it good."

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## Helping Students To Focus on Learning

As an African-American female graduate student in a STEM discipline several years ago, Sandra McGuire discovered first-hand how students can struggle academically because they don't know how to study.

There wasn't any lack in her personal academic performance, though. The third-generation college student had a rich legacy of educational opportunities, and she excelled in her college studies. Her great-grandmother, who was the daughter of a freed slave, had attended college and decided that all nine of her children would attend as well, which they did at historically black colleges in the South.

Rather it was as a graduate TA in chemistry at Cornell University that McGuire saw students struggle mightily, so she took action. She began offering review sessions for students at the new Africana Studies and Research Center on Sunday afternoons so she could fill in the "between-the-lines" information that underprepared students needed to be successful.

That experience was the beginning of a lifetime career of finding ways to help students excel, most recently as professor of chemistry and director of

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## Helping Students to Focus on Learning (continued from p. 3)

the Louisiana State University Center for Academic Success. Now retired, McGuire travels and presents workshops on metacognition with campuses all over the United States, sharing her knowledge from more than 40 years of helping students learn how to learn.

At Missouri S&T in February, she shared at four separate workshops for graduate students, undergraduate students, peer mentors and tutors, and faculty.

"I have found that most faculty are like I was," McGuire says. "I thought that there were certain people who had an aptitude for learning, and those were the people who were going to be successful. But I found that this information on metacognition really levels the playing field. It can empower students to do very, very well, even if they didn't have a great background or preparation."

As evidence, McGuire offers the story of Dr. Algernon Kelley, who started his undergraduate program at Xavier University with all remedial classes. Much of his academic problems were due to dyslexia. Through learning metacognition strategies and perseverance, he graduated with a B.S. in chemistry in five years, and then went on to LSU where he graduated with his Ph.D. in chemistry in 2009. He is now a faculty member at the College at Brockport, State University of New York, and one of his research interests is helping students with learning disabilities excel in STEM courses.

Sometimes, McGuire has to overcome an initial disconnect with a faculty member who thinks that he or she is already encouraging students to do what McGuire prescribes. What's the difference between instructors telling students repeatedly, "You need to study more!" and what McGuire is promoting? Here are some takeaways from an interview and her presentations:

- Students need proof that the strategies work. If evidence isn't the first thing instructors provide to students when they talk about studying, then they will tune out. One way to do this is to show actual students' before-and-after test scores or GPAs. McGuire advises faculty to keep a record of these, and recommends that they can use her examples if they don't have any of their own yet. (Go to [Faculty Workshop on Metacognition](#) to access her PowerPoint presentation with student examples.)
- It is much more effective to have students discover the information (with a little help) instead of being told what to do by instructors, she says. "Students don't really believe this is what they need to do because it's not what they have needed to do in the past to be successful. If they see the difference between what they have been doing and what they need to do through discovery, it is much more likely that they will make a change." That is why she asks students a number of reflection questions in the classroom or in her workshops so they can come up with the answers themselves of what they need to do to be successful.
- One of McGuire's favorite strategies is to show students [Bloom's Taxonomy](#) and explain the different levels of learning. Instructors can ask students at which level of Bloom's they operated to be successful in high school (typically the lower levels of "remembering" and "understanding") and at what levels



Dr. Saundra McGuire

## Appologist Shares At Teaching and Learning Conference

Robbie Melton, self-styled appologist and "the oldest tech person in the world," wants to know why 84 percent of technology is being used for games and only 5 percent for education.

Melton is the associate vice chancellor of Emerging Mobilization Technology for the Tennessee Board of Regents and is intent on changing that ratio. She was on campus as keynote speaker March 12 for S&T's annual Teaching and Learning Technology Conference.

Melton would have fit in perfectly in a Star Trek re-make as she was decked out in sensors and gadgets, with a table filled with mobile technologies for the audience to fiddle with after her talk. Her aim was not to so much to wow the audience as to provoke educators to think about how emerging technologies can be used for teaching and learning.

Her position with the Tennessee Board of Regents, which oversees 50 campuses, is to vet new mobile devices and app technology to increase recruiting, retention and graduation rates and to improve teaching, learning and workforce development.

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they need to operate to be successful in college. Students recognize that higher levels are now required. McGuire tells them that undergraduates need to achieve at least the fourth and fifth levels of “analyzing” and “evaluating” to excel. This gap helps students to realize that what they did in high school will not carry them forward in college work.

- McGuire believes faculty as well as students should adopt the growth intelligence mindset, championed by Stanford psychologist Carol Dweck, that is, that every person can become smarter if they work at it. McGuire believes that all students can succeed if given the correct tools and motivation.

For more ideas about introducing metacognition in the classroom, go here for McGuire’s [Step-by-Step Guide to Introducing Metacognitive Strategies](#).

## Skyles, Hammons Win National Award

Amy Skyles, instructional designer-specialist at Missouri S&T and an adjunct in the biological sciences department, and Angie Hammons, manager of educational technology, have been named winners of the Effective Practice Awards for 2015 by the Online Learning Consortium (OLC).

OLC recognizes outstanding work in the field of online education across multiple categories.



Angie Hammons, left, and Amy Skyles

Skyles and Hammons were one of seven teams of national award-winners for their project “Delivering Experiential Labs to All (DELTA).” The winning practices were selected for recognition based on their ability to provide evidence of innovation and replicability.

The DELTA program is part of the Transforming Instructional Labs project at Missouri S&T, which is funded through a grant from the University of Missouri system. The program helps redesign labs to provide online components to allow for distance education.

“This award represents the work of several instructors who have been willing to step outside of the box and really take a hard look at what they are teaching and why,” Skyles says. “My role in this process has been more of a guide on the side who helps instructors get to the end once they figure out exactly what it is that their course needs to be.”

Hammons adds: “The idea behind the whole concept is to not be stuck in a box or by a label like ‘lab.’ You should teach the way that you need to in order for students to learn the material, no matter what type of course it is.”

Skyles and Hammons will receive their awards at the 8<sup>th</sup> Annual Emerging Technologies for Online Learning International Symposium April 22-24 in Dallas.

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Dr. Robbie Melton, appologist

“I have technology that you thought would never happen,” she said, and proceeded to share about technologies and applications that will allow smart phones to check blood pressure and detect skin or breast cancer; 3D printing of body parts using living cells to create successful implants; Eyetribe – using your eyes to operate a computer; 3D printing that will allow the “manufacture” of a complete 3D car, and much more.

“My job is to make you aware,” Melton said. She wants educators to shape new technologies rather than be passive recipients.

As 2013 Apple Distinguished Educator and named one of the Top 30 Technologists, Transformers and Trailblazers for 2014 by the Center for Digital Education, Melton’s recommendations with software developers go a long way. She may try out a new technology only to go back to the developer and ask for changes to make it more applicable for teaching and learning.

To see a video of Melton’s talk, go to the [Educational Technology website](#).

The bigger the assumptions ...

## The More Students Need to Fall

Is failure a necessary part of learning? Ralph Flori thinks so. That's why he encourages mistakes in his petroleum engineering classes and sometimes sets students up for a fall.



Flori, who is a Missouri S&T associate professor in the geosciences and geological and petroleum engineering department, has been a full-time faculty member since 1990. He started out teaching students in basic engineering, then interdisciplinary engineering, and now in petroleum engineering.

He was recently named by *Ingram's* magazine as a 2015 "Icon of Education," not only for his teaching excellence but also for his recruiting efforts to get students interested in STEM careers through S&T summer programs and Project Lead the Way, a national initiative encouraging pre-college interest in science and engineering.

Flori was cited by the Kansas City business publication, which has more than 100,000

monthly readers, along with eight others "icons" in higher education in Missouri and Kansas.

One of the biggest challenges in the classroom, Flori says, is trying to teach students who think they already know the material. When he sees their eyes roll or glaze over because they have "seen" the content before, he goes about to create tension to expose their lack of understanding. "The faster you can challenge them with a thought-provoking question or idea, or put a quiz in their hands so they know that they don't know it, the faster you can start teaching them," he says.

When students face problems that require a higher level of thinking than what they are accustomed to, they sometimes fall. And he lets them.

"That's a teachable moment," Flori says. "I give students the tools and space and opportunity to work and try things themselves. They sometimes fall, as all learners do, but, they do not fall very far. I am nearby to help them."

Apparently, most students take advantage of the help or at least appreciate this approach. Flori's average teaching evaluation score since 1996 is a 3.57 out of 4. Now in his 25<sup>th</sup> year of teaching, Flori has the same number of total teaching awards, from both on and off campus, including 18 Missouri S&T Outstanding Teaching Awards and a 2005 American Society for Engineering Education National Outstanding Teaching Award, of which he is particularly proud.

### Enjoying students

The reason for his success? One of Flori's key values is respect for every student. More than that, he *enjoys* them, he says, and they know it. "Many teachers focus so much on their subject matter that they never connect with their class," Flori says.

## Award-Winning Faculty From 2014 Honored

Instructors who received teaching, advising or leadership awards in 2014 are featured in a PowerPoint slide presentation on the [CERTI](#) website.

The presentation was shown at the Teaching and Learning Technology Conference held in March.

Congratulations!

## The Benefits of Cumulative Exams

According to an article by Maryellen Weimer, of Faculty Focus publications, cumulative exams help students revisit, review and retain course content.

However, students are averse to these types of assessments because they don't know how to study for long-term retention.

Here are some strategies Weimer suggests:

Use previous or potential test questions as part of the class activities;

Make a habit of asking questions about previous material;

Have students do short reviews of previous material.

Go [here](#) to find out more about these strategies.

“Though I love teaching engineering, what truly makes it special is engaging a new class, meeting and getting to know them as people, and helping them along a path of discovery of the material,” he says. “I love working with students.”

Flori tries to learn as many students’ names as possible, although the larger classes do not always allow for that luxury. He uses every minute of class time to the maximum advantage, with a tight lesson plan, but also time for questions and even humor. While having high standards for his classes, he also provides an abundance of support. He provides high quality notes, review sheets, practice problems, old exams and other aids to help students understand where they went wrong or did right, and to see how an expert approaches the same problem.

In addition to support, Flori tries to ignite a passion for learning by expressing that passion himself. “Frankly, I try to touch the heart, not just arrange neurons in their brains.”

### Re-inventing himself

Although he has been recognized for his skill in the classroom, he considers himself a lifelong learner in search of continuous improvement. After stepping down after four years as chair of the department of geosciences and geological and petroleum

“What truly makes (teaching) special is engaging a new class, meeting and getting to know them as people ... I love working with students.”

--Ralph Flori

engineering in 2014 and assuming a heavier teaching load, Flori decided to help colleague Runar Nygaard, associate professor, team-teach the petroleum engineering senior design class this semester.

“I’ve been stretched in some new areas and I’ve learned new things that have helped me,” he says. “Part of keeping that vital edge is getting out of your comfort zone. You become better.”

In the past, Flori had helped professors in math and physics teach portions of their classes that dealt with engineering applications, however, team-teaching a class for an entire semester is a first for him.

Whether it is teaching senior students who are ready to go into the workplace or foundational classes in mechanics, he has been willing to re-invent himself as the need arose. Seven years ago, Flori was asked to

switch departments while fairly far along in his career. Although all three of his degrees are in petroleum engineering, he had been teaching in other departments for almost two decades. “I literally had to re-learn petroleum engineering in my 50s,” he says.

In 2005 Flori was asked to develop the Project Lead The Way program at Missouri S&T as affiliate director. Under his leadership, the program has grown to over 350 K-12 programs in Missouri with S&T hosting one of the largest PLTW teacher training programs in the nation.

“We’ve trained nearly 1,500 teachers in nine years. We’ve built a strong connection to S&T with these teachers, and they tell their students how amazing of a school S&T is,” he says. “In fall 2014, 37 percent of incoming freshmen report having taken at least one PLTW class.”

No matter what he has been involved in, the focus always comes back to helping students be successful. “It’s a people enterprise,” he says about his job. “Teaching, changing lives, is still the most important thing we do.”

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## Staying Relevant in the Classroom

No one can accuse Bill Gillis of irrelevance when it comes to the classroom. The Missouri S&T adjunct instructor has too many experiences in industry, the military and academia to be anything but relevant to the students he teaches.

One student in Gillis’ recent project management class was so impressed by his ability to relate real life experiences to the course material that he nominated Gillis as Outstanding Professional Engineer in Education. In January, Gillis received word that he was selected by the committee as the winner.

He had no idea how his name had been thrown into the hat, until he found himself at the St. Louis Chapter of the Missouri Society of Professional Engineers banquet accepting the award. He discovered that his former student, who took the class by distance, was the immediate past president of the St. Louis MSPE.

Gillis was gratified to hear about the impact his class had on this working professional. He relishes feedback like this, as it helps him make his teaching as practical and relevant as possible.

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## ***Staying Relevant in the Classroom*** (continued from p. 7)

Having been a project manager on a number of engineering projects in industry, Gillis has both good and bad experiences to draw from, and he tries to help students learn from his experiences by including those lessons in his lectures. Undoubtedly, industry experience prepared him to pass along practical knowledge of practice, but it was his military background that helped him develop an appreciation for teamwork.

His initial team experiences as a student in the classroom were negative. “I didn’t want to do it,” Gillis said. “I didn’t want my GPA lowered because of someone else’s lack of effort.”

Gillis had enlisted in the Army Reserves as an undergraduate at S&T, and an obstacle course in basic training not long afterward changed his mind about the value of teams. “Our group climbed a 50-foot tower with no ropes, no ladders,” he said. “We had to help each other up to each different platform, and they kept getting farther and farther apart. It was quite scary.”

The team was successful, though, and Gillis’ takeaway was that it didn’t really matter who his teammates were. What was important was finding a way to get things done. Regarding teams: “We need to figure out what each other’s weaknesses and strengths are and make the best use we can of them,” Gillis says.

That’s the reason his classes always include collaborative learning in groups, whether he is teaching undergraduate or graduate students. “I break them up into groups immediately and put one or two distance students in each group so they understand what it’s like to work with people in different time zones, and who may have different cultural backgrounds,” Gillis says. “They have a really hard time with it up front, until they figure out how to work with each other.”

Gillis tells them that they are going to get frustrated with their teammates, but that is part of the learning process. “Figure out how to get through it,” he advises them. “Make an ally of everyone you come in contact with. You never know when you’re going to need them.”



### **An unplanned journey**

Gillis didn’t begin his journey in higher education until 10 years after high school, with a family to provide for. He knows what it is like to work full-time and go to school full-time. From Crowder College in Neosho, Mo., he went on to Missouri S&T for his undergraduate degree in mechanical engineering. He then went into industry, getting an MBA at Webster University along the way.

Several career moves later, after returning to Rolla, he taught an e-Business program at Rolla Technical Center and found a new passion for teaching. His students in that program ranged in age from 17 to 62. “Being in that class and figuring out how to work with those people helped me become a better engineer,” he says. “It also sparked my interest in teaching fulltime.”

It was back to higher education for a Ph.D., which he completed from S&T in engineering management in 2013. The entire four years of his degree program, he worked full-time as a design engineer on campus and also taught classes as an adjunct in two departments, giving him great understanding into the challenges faced by students who are working professionals.

Although all of Gillis’ education has been “an unplanned journey,” the latest terminal degree was especially a leap of faith, but he is also anticipating new doors that a Ph.D. can open. “That is the part that is exciting to me,” Gillis says. “I know it will open new doors, and I’m really excited to see what’s on the other side.”

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