



## SCHOOL OF ENGINEERING, MATHEMATICS & SCIENCE FALL 2017 NEWSLETTER

### LEADER IN STEM EDUCATION

#### FROM THE DEAN

As we progress ever closer to our 20th anniversary in 2019, it's hard not to look back with pride at just how far the School of Engineering, Mathematics and Science (SEMS) has come. From just 22 engineering students in 1999 to 926 total students today (545 engineering, 208 mathematics, and 173 science), we've certainly seen some impressive growth. And there's so much more to look forward to.

Our vision for SEMS 20 is to continue becoming a nationally and internationally recognized leader in STEM education. We are committed to creating the "new STEM professional"—one who understands leadership and collaboration in a changing world. We listen to industry leaders and keep their specific needs in mind when designing programs that provide our students with workplace-ready skills. Furthermore, we believe in faculty and student diversity and in providing international opportunities that expose our students to different cultures and prepare them for success in today's global economy.



Some exciting SEMS news:

- In October we hosted the STEM Career Launch, where students had the opportunity to talk face-to-face with local employers about work opportunities.
- Our student members of the National Society of Black Engineers (NSBE) chapter met with President Howard to discuss their participation in the NSBE's upcoming national conference in Pittsburgh in March.
- In a recent article in TEQ Magazine, the Pittsburgh Technology Council promoted how SEMS "graduates industry-ready talent"

- This fall we launched a new Statistics and Predictive Analytics degree to meet the growing need for qualified data scientists.
- SEMS will soon become a member of the Advanced Robotics for Manufacturing (ARM) Institute—a nationally-known, public-private partnership founded by our colleagues at CMU, which actively develops, demonstrates and facilitates early adoption of robotic solutions in an effort to grow the national manufacturing ecosystem.

These are just a few of the exciting things going on in our school. You'll find much more in the pages to come.

Best wishes always,  
 Maria V. Kalevitch, Ph.D.  
 Dean & University Professor

## SEMS STUDENTS VISIT G.E.



On September 22, six RMU engineering students — Drew Garbenis, Nolen Keeys, Daniela Nkama, Jessica Sales, Yukihi Suzuki, and Daniel Walter — visited the General Electric Additive Customer Experience Center in Findlay Township.

Accompanying them were Dean Maria Kalevitch, Department Head Dr. Arif Sirinterlikci, and Dr. Rika Carlsen, assistant professor of mechanical and biomedical engineering. Also taking part in the tour were RMU President Dr. Chris Howard, Provost David Jamison, Vice President of Corporate Relations and Senior Vice Provost Dr. Derya A. Jacobs, and Xavier M. Hickman, special assistant to the president.

“It was a great experience to see the same technology we have at Robert Morris used on an industrial-level scale and how a large corporation like GE is utilizing additive manufacturing in their different divisions,” says senior mechanical engineering student Daniel Walter.

During the tour of the facilities, the students learned about GE’s work in additive manufacturing from Jennifer Cipolla, who runs the center. The students also had the chance to meet with a recent RMU engineering alumnus and Junior Additive Engineer Jessica Gonzalez ‘17.

## ALUMNI BRUNCH WITH THE DEAN

On September 16, alumni, faculty, and friends joined Dean Maria Kalevitch for a brunch in John Jay Center to kick off the Homecoming 2017 festivities. During the gathering, the school unveiled the new logo for its upcoming 20th anniversary.



## CRASH AND LEARN



On August 5, a team of five mechanical engineering students — Roger Pogoda, Luke Schubert, Madison Parks, Nick Mummau and Drew Garbenis — finished 9th out of 37 teams at the Red Bull Flugtag competition during the Three Rivers Regatta.

Red Bull Flugtag challenges entrants to design, build and pilot homemade flying

machines off a 22-foot-high flight deck. Teams are judged on flight distance, creativity of the craft, and showmanship. This was the first time the flying-contraption competition has come to Pittsburgh.

Over the course of three months during the summer, the engineering students constructed a huge glider with a 20-foot wingspan. During the competition, the students performed a brief skit where they were dressed as Colonial and British soldiers and battled it out on top of the flight deck. Pogoda then piloted the glider 45 feet before plunging into the Allegheny River.



“I went through a whole spectrum of emotions in the span of about 4 seconds,” says Pogoda. “You don’t realize how high two stories is until you’re pushed from that height in a homemade glider! It was such a cool, unique experience that was made even better by the fact that I got to do it while representing RMU.”



Project advisor Dr. Tony L. Kerzmann says the Flugtag competition was a once-in-a-lifetime opportunity for him and the students. “It combined engineering, creativity, craftsmanship, and even theatrics,” says Kerzmann, RMU associate professor of Mechanical Engineering and co-director of SEMS-ROC (Outreach). “The entire production lasted less than a minute, but it took a team of RMU students months of hard work, planning, meetings, and hundreds of hours of time. The amazing, hands-on, experiential learning they received was invaluable.”

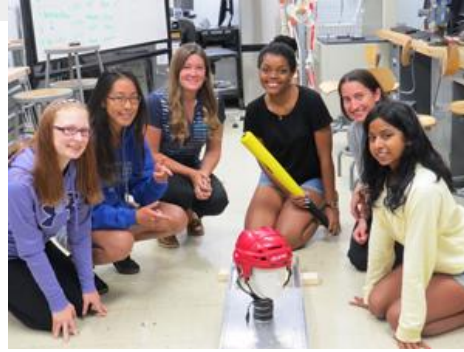
## LEARNING IN 3D

The School of Engineering, Mathematics and Science has leased space at the Pittsburgh-based Energy Innovation Center (EIC) in order to establish a 3D Printing/Advanced Manufacturing Lab for both research and teaching. The laboratory development will be handled by Department Head Dr. Arif Sirinterlikci and Dr. Priyadarshan A. Manohar, co-director of SEMS Research and Outreach Center. Dean Maria Kalevitch worked with the EIC and R.K. Mellon Foundation to acquire the \$350,000 grant for the construction of the lab and creation of the certificate programs.

The laboratory will include both applied research space and teaching areas. Later this year, we will see the completion of a fully equipped Advanced Manufacturing, Energy and Sustainability laboratory, specifically designed for applied research utilizing 3D printers. The lab will also allow for hands-on experiments and demonstrations associated with advanced additive manufacturing and renewable energy topics such as solar, wind, hydro and biofuels. Furthermore, it will be used to teach topics related to energy efficiency, thermodynamic cycles, and conventional energy sources such as clean coal, natural gas, and other fossil fuels.

Three certificate programs — Manufacturing Engineering, Advanced Additive Manufacturing, and Energy Engineering and Technology — will allow engineering and technology personnel working in the industry to obtain their academic and professional credentials and thus help develop their future career paths. RMU currently has Pennsylvania’s only ABET-accredited bachelor’s degree in Manufacturing Engineering.

## HI-TECH CAMPING



This past summer SEMS Outreach held its annual Animatronics camp for local students. Hosted by Department Head Dr. Arif Sirinterlikci, the camp gave area students in grades K-12 the opportunity to design and built robots.

Dr. Rika Carlsen, assistant professor of mechanical and biomedical engineering, hosted the Girls in STEM Research Camp, in which students participated in multiple research projects related to head trauma.

Dr. Benjamin R. Campbell, assistant professor of engineering, ran the Music and STEM and Electro-Optics Camp, in which students were introduced to electro-optics and microcontrollers and used Arduinos to build electronic instruments and compose their own music.

Dr. Tony L. Kerzmann, co-director of SEMS-ROC and STEM Education and Outreach, hosted the Energy Ties camp for middle school students and the Great Energy Race camp for high school students. During both camps, students learned about sustainable energy and designed, built, and raced energy efficient cars.



## LEGO BOBBY MO

This past May, RMU engineering students Hannah Arnold and Andrew Mason completed a bust of Robert Morris using LEGOs. The project was conducted under the supervision of Head of Engineering Dr. Arif Sirinterlikci. Engineering student Steven Lopez and Cyber Forensics and Information Security student Hannah Bartus also contributed to this project.

Working with a 3D laser scan of the plaster bust currently located in RMU's Heritage Room, the team converted the data into an OBJ file, a standard 3D image format that can be exported and opened by various 3D image editing programs. The OBJ file was then input into multiple LEGO digital design software packages for breaking the geometry into the plastic bricks.

Arnold and Mason's expertise enabled the team to manually modify the digital design and optimize the brick structure. The bust is hollow for weight control and for accommodating future changes, including the addition of animation features.



## STUDYING BRAIN INJURIES

As part of a multi-university collaboration, RMU is currently investigating the extent of neural damage that results from repeated traumatic brain injury.

Dr. Rika Carlsen, assistant professor of mechanical and biomedical engineering, is leading RMU's team of researchers. "Our goal is to develop a better understanding of the structural and functional changes that occur in the brain following these injuries and the role that these changes have in the neurodegeneration process," says Carlsen.

RMU's undergraduate research team is also developing a 3D printed physical head model that replicates the anatomical structure of the human head and will allow for the visualization of brain tissue deformations under various head impact conditions.

Carlsen says it's through this integrated experimental and computational approach that they hope to gain valuable insight into this injury process, potentially leading to new methods for preventing and mitigating traumatic brain injury.

Over the summer, Daniela Nkama, a junior biomedical engineering major, assisted Dr. Carlsen with her research, focusing on developing polyvinyl alcohol (PVA) brain gels and creating a 3D printed brain mold.

"Biomedical engineering brings the concept of health sciences and engineering altogether, which enables the development of studies such as traumatic brain injury and could aid in its prevention," says Nkama. "This experience enabled me to apply what I have learned in my engineering classes as well as expanding my knowledge on traumatic brain injury."

## VETS GET FREE 3D TRAINING AT RMU



In partnership with Google and the General Electric Center for Additive Technology Advancement, RMU recently hosted a free, month-long workforce development “boot camp” to train 16 local veterans in 3D printing and manufacturing. The camp, which took place in June, was taught by Engineering Professor and Department Head Dr. Arif Sirinterlikci and Lab Engineer Chris Scriva.

The curriculum for the training was developed by 3D Veterans ([3dveterans.com](http://3dveterans.com)), with RMU’s assistance, and included hands-on training in additive manufacturing and computer-aided design. It also included a three-day workshop on metal 3D printing at G.E.’s Center for Additive Technology

Advancement in Findlay Township. The training session concluded with job-search assistance for the participants, including interviews with representatives of local and national manufacturing companies.

## NEW FACULTY MEMBERS

SEMS recently welcomed two new faculty members to the team:



**Qian Zhao**, Ph.S., is an assistant professor of actuarial science and mathematics. Dr. Zhao received her Ph.D. in Mathematics from University of Wisconsin-Milwaukee, as well as an M.S. in Geophysical Engineering and B.S. in Applied Mathematics from the China University of Geosciences-Beijing. Her primary research interests lie at the intersection of actuarial science, robust statistics, and risk analysis. Specifically, she focuses on the development of robust statistical tools for measuring and pricing insurance risks.



**Sarajane A. Hill** is a lecturer of engineering. She earned an M.S. in Mechanical Engineering from the University of Pittsburgh and a B.S. in Engineering from Geneva College. Hill has work experience as an application engineer for ALGOR, Inc., working in finite element design. She also previously taught at Geneva College and the Community College of Beaver County. A western Pennsylvania native, she currently resides in Economy.

## SEMS BOARD OF VISITORS

On September 26, Michael Broeker, Gary Fedder, and Alan West, members of the SEMS Board of Visitors (BOV), met with President Chris Howard and Provost David Jamison to review the white paper detailing last year's Board of Visitors Retreat. During the meeting, they focused on a few key issues including:

- The value of the Retreat in providing board members with a much better understanding of the school
- The importance of the planned SEMS facility expansion
- The importance of industrial collaboration in staying current with market and technological dynamics (e.g., cybersecurity and regenerative medicine)
- The need for improved marketing/PR to highlight SEMS's and RMU's many successes
- The value of adding someone with a STEM background to the board

The board's recommendations were well received and appreciated. Both the President and Provost expressed their thanks for the time and effort of all board members and said they were impressed that so many members had attended the retreat. President Howard added that he would like to discuss the white paper at the December Trustee meeting and have a board member(s) attend.

## SEMS STUDENT AWARDED LARGEST ENDOWED SCHOLARSHIP



Rebekah Wilford, a freshman in RMU's top-rated actuarial science program, is the recipient of the Highmark Presidential Actuarial Scholarship, which is awarded to one student per year and covers full tuition. Wilford, who attended Norristown Area High School in suburban Philadelphia, is involved in a number of organizations, including Coalition for Christian Outreach, RMU Sentry Media, Women's Leadership and Mentorship Program, the University Honors Program, and the Actuarial Science Club.

## SEMS MAKES THE TEAM

As the region continues to evolve and adapt to new opportunities in energy and petrochemicals, RMU has been invited to take part in a new coalition to address the growing needs for workforce education and training.

The Tristate Energy and Advanced Manufacturing (TEAM) Consortium is a coalition of educational institutions, workforce development organizations, economic development agencies, and industry and nonprofit entities. Led by the Community College of Beaver County and convening various partners across a 27-county area in western Pennsylvania, eastern Ohio, and northern West Virginia, TEAM will focus on building the workforce for energy and advanced manufacturing companies in the region. The consortium was funded by a gift from the Claude Worthington Benedum Foundation.

RMU President Christopher Howard has designated Dr. Maria Kalevitch, SEMS Dean, as RMU's official representative for the consortium.





## STUDENT SPOTLIGHT: NOLEN KEEYS

Nolen Keeys, a senior biomedical engineering major, is the first RMU student named an institute scholar by the Institute for Responsible Citizenship, which chooses 12 of the most talented African American male college students in the country each year for a summer leadership training and internship program in Washington, D.C. This past summer, the institute placed Keeys in an internship with the NFL Players Association Trust, a wellness program for former players.

“I’ve put a lot of hard work into studying, making sure I maintain a high GPA and building a strong resume. I can now see my career and my future starting to take shape,” says Keeys, a native of Temple Hills, Md.

Keeys plans to attend medical school to become an orthopedic surgeon. He is a member of the National Society of Black Engineers, a peer tutor, and a volunteer at the Veterans Administration hospital near his hometown.

“Nolen appears to be exactly the kind of young man that the Institute was created to serve. He is brilliant yet humble. And

he is driven to be successful for reasons that are noble,” said William A. Keyes, founder and president of the Institute for Responsible Citizenship.

“Nolen truly embodies the ideals and values of a student leader,” says faculty adviser and Associate Professor of Engineering Management Dr. Woodrow W. Winchester III. “This has been notably exemplified in his coordination of RMU’s NSBE chapter.”

Keeys will be representing RMU along with his fellow NSBE members this March 21-25 in Pittsburgh for NSBE44—the society’s 44th annual convention.

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