President Worthen Honors CPMS

Nielson also provided outreach to under-served students and teachers in Uganda by implementing a self-sustaining teacher-education program. She is a wonderful teacher who follows the model of teaching exemplified by Professor Maeser.

Wood teaches large undergraduate classes in general, organic, and biological chemistry. Both students and colleagues consistently rank him as an outstanding teacher. He has invested hundreds of hours creating online tools to build an understandable tutorial for students learning chemistry, and he obtained a National Science Foundation grant to further develop these tools. This external support allowed him to involve student collaborators, who were instrumental in helping decide which approaches would be the most beneficial to students. These online tools are now important contributors to students’ learning.

Because of his teaching prowess, Wood is a frequent mentor to new and senior faculty. He is a master teacher who genuinely loves his students and the excitement of teaching chemistry.

Goates appropriately balances classroom rigor with reasonable expectations for his students. He believes in empowering students with knowledge; as a result, they leave his courses with a recognition of their personal growth and a sense of having been rewarded for their efforts. He encourages students who are struggling and makes concrete suggestions for their progression.

Goates has been instrumental in developing curriculum within the department: Largely through his efforts, new courses have been designed and implemented that better prepare students for their careers. In short, Goates is an exemplary teacher who consistently blesses his students.

Karl G. Maeser Excellence in Teaching Award
Steven R. Goates Chemistry and Biochemistry

Goates is a committed professor who consistently strives to provide a solid educational experience for her students. She is rigorous in her approach to organic chemistry, yet she has learned to present complex material at a level that prepares her students for graduate and professional schools as well as for careers in nursing and other sciences. She is an active advocate for science education in the community and has initiated a series of hands-on science events at the Provo Library to spark an interest in science in elementary-age children.

Karl G. Maeser Professional Faculty Excellence Award
Jennifer B. Nielson Chemistry and Biochemistry

Nielson is a committed professor who consistently strives to provide a solid educational experience for her students. She is rigorous in her approach to organic chemistry, yet she has learned to present complex material at a level that prepares her students for graduate and professional schools as well as for careers in nursing and other sciences. She is an active advocate for science education in the community and has initiated a series of hands-on science events at the Provo Library to spark an interest in science in elementary-age children.
Professor Bob Wadley takes a step back while teaching, and looks at the concepts through the eyes of his students. By doing this, he can greatly change the way he presents material to his class, and is able to teach in a clearer way.

“Sometimes our own knowledge and background is so strong that we forget about the fact that it might be completely new and somewhat foreign to our students. If we can try to perceive our content as they are perceiving it, we will be more efficient and effective teachers,” Wadley said.

In a forum given on Tuesday, July 28, Jani Radebaugh brought the exotic lands of Ethiopia, India, Antarctica, and even Jupiter, Saturn, and Titan to BYU.

Radebaugh, associate professor in the Department of Geological Sciences, spoke on her adventures and explorations both in and beyond this world. She emphasized the importance of not just the discoveries being made in the field of planetary science, but also of going on expeditions.

“Why would we undertake these kinds of expeditions as scientists?” Radebaugh said. “Why do we think it’s scientifically valuable to go out and observe the geology in action? We explore so that we may discover.”

Radebaugh recounted an experience of a long trek she and a group of others took through Ethiopia to witness a brewing volcano.

“It is hard to describe what it is like to witness the creation of new land,” Radebaugh said. “We understand as scientists that we can learn more about our natural world simply by exploring it. So we endure, and maybe we even enjoy, the hardships that come along with such an endeavor.”

Through her explorations Radebaugh has been able to conduct research to help others better grasp Earth’s geology. By studying other planets and moons, we are better able to understand our own planet.

On the flip side, Radebaugh showed how studying Earth can help us understand our solar system.

“One place that perfectly blends Earth exploration with discovery in space is the deep field of Antarctica,” Radebaugh said. “Somehow it’s in the cards that we must go to the most remote location on the planet — the place most difficult to access in every way, the place most challenging to live and survive in — in order to find the biggest collection of pieces of rock from outer space.”

In her cold quest across Antarctica, Radebaugh has found many meteorites. Although meteorites can be found all over the Earth, they are better preserved in Antarctica because of the cold, dry climate.

“It is a treasure trove of specimens from all across the solar system,” Radebaugh said. “These rocks speak to us of our origins, for they are siblings of Earth.”

Radebaugh does not go on these journeys alone. Students have accompanied her as she travels across extreme environments to better understand our own planet Earth.

“When we go as scientists, we see a different kind of beauty,” Radebaugh said, speaking of fragile, wind-carved ridges. “We feel lucky to see [these creations] because we know they disappear quickly.”

Radebaugh’s main research areas focus on geological processes on planetary bodies including Earth, Saturn’s moon Titan, Jupiter’s moon Io, and Earth’s Moon. Radebaugh has also done research in Namibia, Hawaii, the Sahara Desert, and many other locations.
professionally, Kowallis is consistently rated as one of the best instructors in that teaching area. He has blessed many students, who appreciate his knowledge and his enthusiasm. His love for and success in teaching within Religious Education serve as an example for other transfer faculty in his college and throughout the university.

Alcuin Fellowship
Matthew R. Linford
Chemistry and Biochemistry

Linford is an especially effective professor in the classroom. He dedicates countless hours to his students, taking the time to walk them through each step in solving a problem and making sure they understand every aspect of the solution. He also collaborates with specialists nationally and internationally to ensure his students receive the best education possible.

In addition to teaching his graduate and undergraduate students, Linford enjoys conducting research and thrives on the creative processes that make up chemistry. His contributions of excellence truly enrich the BYU community.

Young Scholar Award
Daniel H. Ess
Chemistry and Biochemistry

Ess makes significant contributions to the field of chemistry. He develops and utilizes quantum-chemistry methods in his research and has published nearly 50 peer-reviewed scientific papers. For his research, Ess has been awarded several grants from the Department of Energy, the National Institutes of Health, and the chemical industry. His research’s unique emphasis of making experimental predictions has resulted in several scientific collaborations around the world.

While he conducts such unique research, Ess also makes teaching a great priority. His research group is comprised of postdoctoral, graduate, and undergraduate students, and he takes the time to teach and mentor each of them. His love for chemistry is contagious and a great contribution to BYU.

BYU Class of 1949 Young Faculty Award
Jaron C. Hansen
Chemistry and Biochemistry

Hansen’s love for teaching and for his students is apparent in every class. He conducts research with his students to delve into the finer points of chemistry and make new discoveries. He makes sure to involve his students at every turn, so they can gain as much from the research as he does.

Hansen’s primary area of focus is in air sampling and renewable energy, which has led to important research in monitoring air pollution in Southern California. He keeps his students active and excited in the research, while he simultaneously helps them develop a love for chemistry.

Technology Transfer Award
Steven W. Graves
Chemistry and Biochemistry

Graves’ contributions to the medical field have been vital to the Cancer Research Center and to medicine as a whole. He has been researching the effects of sodium pumps in various medical situations, including treating disease and during childbirth. His studies provide evidence that will aid mothers and children affected by preeclampsia.

Additionally, Graves has contributed to the discovery of new serum biomarkers that diagnose Alzheimer’s disease. He is a blessing to medical research and a true asset to BYU.

Lawrence K. Egbert Teaching & Learning Faculty Fellowship
Kent L. Gee
Physics and Astronomy

Gee’s dedication to his students is inspiring. He puts in a consistent effort to positively impact each of his students in at least one way. He has a true passion for teaching and makes sure to include students in every aspect of his research.

Gee’s research group is comprised of multiple concurrent students, and together with his research group he has published over 80 articles and proceedings papers. His findings have attracted the attention of many important organizations: He has received funding from: the Office of Naval Research, NASA, the Air Force Research Laboratory, the NSF, and several industry sponsors, including ATK Space Systems.
At the Core of Common Core

Through papers and practice exercises, mathematics education professor Dawn Teuscher works to ease the transition for grade-school math teachers into the new government-issued curriculum requirements.

Since Common Core—a set of academic standards to unify the K-12 curriculum nationwide—was first introduced in 2010, it has been met with strong opinions and arguments about its worth. Common Core was created to ensure that students are taught the same mathematical concepts in the same grade levels in every state. One goal of Common Core is to help students not fall behind or get ahead if they ever have to change schools.

Teuscher has taken part in researching Common Core, and together with her colleagues she published a paper in January 2015, titled, “Common Core State Standards in the Middle Grades: What’s New in the Geometry Domain and How Can Teachers Support Student Learning?”

“It’s very politically charged,” Teuscher said. “[This research] is providing a thorough examination of a very politically hot topic, and it’s trying to provide all stakeholders . . . with a better understanding of what Common Core is, and how we can . . . help all the stakeholders that are involved.”

This research delves into what changes have occurred due to Common Core—specifically in geometry content for grades six, seven, and eight. These grades are said to be the most affected by Common Core.

“We went through and looked at geometry in . . . elementary school through junior high,” Teuscher said. “We found that 52 percent of the middle grades—grades six, seven, and eight—learning expectations were new. So over half of the learning expectations that our teachers need to be teaching . . . are new.”

Teuscher found three main concepts that have been introduced into the curriculum: geometric transformations, drawing & constructing two-dimensional geometric shapes, and understanding a proof of the Pythagorean theorem.

“It’s important for parents to realize that . . . it’s not just the kids that are struggling through this, but the teachers are having to struggle through this as well,” Teuscher said. “They are being asked to teach things that they possibly never learned.”

These new concepts have either previously been taught in high school, or they are new concepts to be taught altogether. With such a difference, Teuscher saw the importance of giving guidance to those affected by Common Core.

“In our paper we provide different activities for each of these three areas . . . to help the teachers understand the concept,” Teuscher said. “[We have] activities they can use with their students that will help middle school students delve into the mathematics and build on their current understanding of the mathematics.”

Teuscher hopes that as implementation of Common Core continues, others will receive the help they need to overcome the challenges they are facing.

“It’s not going to go away. And if it’s not going away, what can we do with our research?” Teuscher said. “How can we best help those who are charged with implementing it?”

For the Love of Teaching . . . And Physics

Left: Brian Anderson will be returning to teach at BYU after spending four years at the Los Alamos National Laboratory

After being away four years, Brian Anderson will return to BYU as a faculty member in the Department of Physics and Astronomy.

“The students at BYU work hard and have strong morals, which helps make teaching and mentoring them truly enjoyable,” Anderson said. “I’m excited to be free to openly share not only my passion for science but also my religious convictions with students.”

Anderson was a visiting assistant professor at BYU from 2009 to 2011 before becoming a research scientist at Los Alamos National Laboratory. He earned his BS and MS in physics from BYU in 2001 and 2003, respectively, before receiving his PhD in acoustics from Penn State in 2006.

Anderson’s professional research and education have given him valuable insights he can take to the classroom.

“My experience in the national lab environment gives me a unique perspective on the major research challenges the U.S. Government is trying to solve,” he said, “particularly in the areas of energy resources and homeland security.”

Although he enjoys solving research problems, ever since high school Anderson has known that he wanted to teach.

“My high school physics teacher showed me how fun teaching physics could be,” Anderson said. “When I saw the enthusiasm Jack Weyland had for teaching two physics courses I had as a student at Ricks College, I knew I wanted to be a professor. These two teaching mentors truly made the course material exciting and I could see how fun a career in teaching could be.”

Starting in the fall, Anderson will be teaching acoustics courses at the undergraduate and graduate levels along with introductory and general physics courses.

“I love developing and sharing demonstrations of physical phenomena,” Anderson said. “I enjoy seeing how visual demonstrations help solidify concepts in students’ minds and open their eyes to how things work all around them.”

Anderson hopes that he can teach his students both physics and how to get the most out of their education.

“Later on in life, [students] will benefit more from what they learned than the grades they got,” Anderson said. “Getting good grades is important, but it should not be one’s sole focus as they invest in learning.”

While Anderson’s love for teaching and physics brings him to BYU this fall, he’s also excited to continue his geocaching hobby in Provo with his wife and three boys.

“It’s a great reason to get the kids outdoors and give them something to look forward to on hikes,” Anderson said. “In fact, there’s around 30 geocaches on BYU campus that students walk by daily.”

By Camilla Stimpson

Left: Dawn Teuscher’s paper on Common Core will help teachers who are struggling to adapt to the new curriculum.

By Tanner Call
In 2004, Christensen and one of his peers began researching how to use anthrax to shrink tumors and treat eye diseases. They have been awarded at least four grants from the National Institute of Health (NIH) to conduct this research.

“It’s hard to figure out a pathway that nobody understands,” Christensen said. “We’re finally at the point where we have a pretty good idea of what might be going on.”

After being interviewed in December 2013, he was approached by BYU in May 2014 to negotiate about the job. “They pretty much accommodated all my needs,” Christensen said. “At that point, I thought, ‘Maybe we’ll go to BYU.’”

Later in the summer of 2014, he and his family made the decision to move to Utah in May 2015. Christensen will be teaching Chemistry 105 in the fall and an upper-division class in the winter.

Christensen first became interested in chemistry in high school. After getting a summer job that extended beyond the bounds of general chemistry, his passion grew for the science and he continued to pursue it as a degree.

Although he did not originally plan to become a professor, he decided to give it a shot—since then he has enjoyed research, teaching chemistry classes, and advising students.

“I hope to have fun and do some meaningful science,” Christensen said. “[I want to] train future scientists, graduate students and undergraduates, to go on and make an impact in the world with whatever they want to do.”

Throughout his career, Christensen has had the opportunity to work on advancing aspects of biomedical research.
Both the doctors who treat multiple sclerosis and the people who experience it agree that the disease is highly unpredictable.

While that remains true for the disease in general, a new study introduces a method for making personalized predictions.

The research is a culmination of an eight-year partnership between BYU statistician David Engler and researchers at Massachusetts General Hospital.

"The goal all along has been to develop personalized transition probabilities with regard to where they are in the disease process and where they’re most likely to go in the near future," Engler said.

MS puts the body’s immune system against its nervous system. Forecasting the course of MS in an individual is a challenge because the disease can take so many different turns. And how a patient feels today is not very predictive of how they will feel in the near future.

Instead, Engler’s method is based heavily on the individual patient’s history. Every six months, people with MS share certain information with their doctor. First, they answer yes or no whether they experienced a “relapse.” Second, they estimate the intensity of their symptoms on a 21-point scale (0, 0.5, 1.0 … 9.0, 9.5, 10).

A doctor using the model would simply plug in the relapse and intensity information for the past two checkups, along with a few bits of demographic data.

The model then returns the odds that MS will retreat to a milder stage, advance to a more aggressive stage, or maintain the status quo in the next six months.

"If the model suggests you are likely to be in a more debilitated state six months from now, your doctor might recommend a more rigorous treatment regime," Engler said.

The model can also reduce fears in other cases. Alison Wadsworth received her diagnosis 25 years ago and has continued a very active life. She says the literature she received after her diagnosis painted very dire pictures of the future.

“I would have loved knowing that there are many of us that manage to lead an almost-normal life with diet and exercise and lifestyle changes rather than becoming dependent on medicine that is very expensive,” Wadsworth said.

To test the model’s usefulness, they applied it to 1,123 MS patients in Boston. As the authors write in Statistical Methods in Medical Research, their approach is well-suited to identify predictors of a transition from the relapse-remitting phase to the secondary progressive phase of the disease.

“This is important because currently, the majority of MS treatments are effective in preventing new relapses, however to date, most of these therapies have shown little impact on overall disease progression,” said Tanuja Chitnis, a study co-author. “This tool may help to identify new treatments which improve overall disability measures.”

Before he began teaching at BYU, Engler earned a Ph.D. in biostatistics from Harvard in 2007 along with his co-author, Brian Healy. This is the fifth study on MS that they’ve authored together. One of those studies demonstrated how to cut down on false diagnoses. Another demonstrated how to measure the impact that medication is having for MS patients.

“As with anyone publishing medical literature, you hope that what you find makes a difference out there,” Engler said. “Every day, there are new medical findings, and you hope that proven methods are implemented.”

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