

FACULTY newsletter

CPMS Physical and Mathematical Sciences

Success Stems from Mistakes



Above: Adam Woolley accepts his American Electrophoresis Society Midcareer Award

"If you're not failing at things, you're not trying."

Adam Woolley, associate chair in the Department of Chemistry and Biochemistry, had these very words spoken to him when he was a student. Due to this instruction, Woolley did not simply give up when facing mistakes, but learned

from them. His hard work paid off, and he has been recognized with the American Electrophoresis Society (AES) Mid-Career Award. This award honors those who have made exceptional contributions to the field of electrophoresis during their career.

"I was really surprised. It's a great

honor," Woolley said. "It makes me look really good when I've had students who are so successful and work hard and accomplish great things."

Making mistakes does not mean you will not be successful. Woolley has made many significant contributions toward the field of electrophoresis throughout his career despite set-backs.

"You learn a lot by failing," Woolley said. "Obviously I'd like everything I do to be successful, but that doesn't always happen. I take a lot of satisfaction and joy in the things that do work. That gets me through the things that don't [work]."

One of many influences Woolley has made includes research to help prevent the negative effects of premature births.

"If we can develop some of the . . . techniques to work well enough, then the hope would be that we can deploy these into doctors' offices," Woolley said. "Doctors can determine if the woman is at risk for preterm birth, and can start taking action to help the mother and the baby, and improve the outcomes."

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Math and Mentoring

BYU math professor Paul Jenkins' passion lies in helping students find their own research projects to work on.

"It's been a really rewarding thing to be involved in mentoring," Jenkins said. "It's been one of the most rewarding parts of being on the faculty here."

When he was an undergraduate at BYU (BS '00, Mathematics), Jenkins became interested in mathematics when his Number Theory professor David Clark helped him get involved in a research project.

"I loved the experience of doing research as an undergraduate," Jenkins said. "When I came back here as a faculty member, this was something I was excited to do: to work with the great students we have here and help them get involved in research."

For his latest research project, Jenkins worked closely with recent graduate Kyle Pratt. Together, they tackled

the challenge of finding coefficient bounds for modular functions.

"The idea mathematically is that for certain mathematical objects, called modular forms, one question you can ask is how quickly the coefficients grow," Jenkins said.

Jenkins had found the coefficient bounds for a certain set of modular forms in previous research, but he and Pratt wanted to extend those results to a larger class of modular forms.

"It was a natural question," Jenkins said. "We had done it for the easiest case, but the question was whether these results were still true as you looked at more complicated examples."

Pratt was a coauthor on the paper Jenkins published. Jenkins said that Pratt's work on the project was beyond what he'd expected of an undergraduate student.

"I was extremely impressed with what



he was able to do," Jenkins said. "I think it really prepared him well for the graduate work that he's doing."

Announcements

Submission Deadline for Graduate Mentoring Awards (GMA)

Friday, January 15, 2016

Submit applications to Denise Gibbons Davis, Graduate Studies office.

SRC Abstract Submissions

Abstract submissions will be accepted starting Friday, January 15, 2016
Visit src.byu.edu for more information.

Graduate Student 3MT Applications Deadline

Monday, January 25, 2016

See 3mt.byu.edu for more information.

College Award Nominations

Due in the college on Monday, February 1, 2016

University Faculty Award Nominations

Due in the college on Monday, February 1, 2016

Faculty Teaching Workshop/Luncheon

Tuesday, February 9, 12 p.m. – 1 p.m.
3211 WSC

Teaching Moment

Professor Mike Goodrich finds that the most effective way to help students is to love them. “When I take the risk of ignoring how I might be perceived by students and instead focus on their learning, [everything] that helps me be an effective teacher seems to follow,” Goodrich said.

Goodrich also finds it beneficial to involve technology in the classroom to help students not only learn, but also to get engaged in the work.

“We have great students. I’ve found that if I teach them great and important ideas in my field, they do all the hard work of staying engaged by themselves.” Goodrich said.

Stemming Success

Woolley has been working in the field of electrophoresis ever since he began working toward his PhD. During that time, he experienced many successes and challenges, one of which includes spending six months on a project that reached a dead-end. This experience has enabled him to relate to students during their own research.

“It’s one of those things where you learn through failure,” Woolley said. “I don’t intentionally set [students] up with these failed experiments, but sometimes it happens. They learn a lot

Weather Vane Points to BYU

It’s statistically unlikely to go from a BYU undergraduate to a BYU professor in just five short years, but Robert Richardson overcame the odds.

BYU is pleased to announce the addition of Dr. Robert Richardson to the Department of Statistics. As a very recent PhD graduate, Richardson is expected to add new excitement to the increasingly popular statistics major.

Originally from Arizona, Richardson graduated from BYU with a bachelor’s degree in statistics in 2010. Shortly after his graduation, he spent four years working on his PhD at the University of California Santa Cruz, which he completed in June 2015.

“I actually kept in touch with some people here at BYU,” Richardson said. “It happens to be a good fit . . . There are a lot of people [here] who do research similar to some of my research areas.”

Richardson’s area of specialty during his PhD was spatial temporal statistics, which includes collecting data sets that can be applied to different climate models. In this field, it’s possible to predict natural phenomena like El Niño by using data sets such as ocean surface temperatures.

Richardson’s decision to study statistics stemmed from an unusually diverse set of interests that he developed early on in his education.

“I actually was interested in too much stuff,” said Richardson. “One of the things about statistics that I liked was that I could do everything. I’ve been in things like ecology, environmental science, and applications in chemistry and engineering.”

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from [failure] because they can better recognize success.”

The biggest lessons Woolley and his students learn from their errors is how to find excitement in the accomplishments they do achieve and how to ask the right questions.

“Sometimes you have to do a bunch of experiments that give you no useful results to realize that you’re asking the wrong question,” Woolley said.

By working individually with students, Woolley is able to open their eyes to the bigger picture and see more than



Above: Robert Richardson returns to BYU with his family to teach statistics

According to Richardson, landing an entry-level job in statistics can be tough without proper preparation. Even though there are hundreds of jobs in statistics, he says, there are also hundreds of applicants. The solution he proposes is to make the right connections as an undergraduate.

“It’s important to get good grades, but if you know what you want to do after graduation, there’s more that you can do,” said Richardson. “You can make connections. You can try to find internships and experiences. I think there are a lot more experiences than undergraduates realize.”

By Jeremy Stanford

just what has gone wrong.

“Sometimes they get so involved in the experiment, they don’t even realize how much progress they’ve made,” Woolley said. “When you point out to them the progress they’ve made and what they’ve succeeded [in doing], that helps.”

Woolley has seen his students go on to work in industry, in government labs, and at universities like Brigham Young University-Idaho.

By Camilla Stimpson

Faculty Funding & Publications Goals



From the TI 99-4a to Artificial Intelligence

Dr. David Wingate loved programming even when computers didn't have disks and he couldn't save any of the code he had painstakingly entered.

"You had to type [the program] in every time," Wingate said. "But I remember thinking, 'This is really neat! I can tell this thing what to do and it does it.'"

Wingate, who arrived at BYU this fall as a new assistant professor in the Department of Computer Science, started working with computers as a young child. He used old machines his physicist father brought home, including the TI 99-4a, which was released in 1981.

"I would change random things in the program," Wingate said. "Sometimes it would break spectacularly, and sometimes it would do something really weird, and I just thought that was really cool."

Wingate grew up working on computers, and he even worked several computer jobs in high school, so he knew exactly what he would study at BYU: computer science, specifically artificial intelligence.

He earned both bachelor's and master's degrees in computer science from BYU, then moved to Ann Arbor and earned a doctorate degree in computer science from the University of Michigan.

After three years as a postdoctoral researcher at MIT and working in industry for a few years, Wingate is back at BYU to research and teach. It wasn't a huge surprise for him and his family to return to Provo.

"We had always felt like maybe we should come back at some point," Wingate said. "We just weren't ever sure when that might be."

The research part of his job is nothing new; he's been involved in research ever since he was a kid changing the programs he typed into old computers. This will be his first time as a teaching professor, though.

"I've taught classes, but I've never owned a class before," Wingate said.



Above: BYU welcomes Dr. David Wingate to the Department of Computer Science

"So it's a bit of an adventure. But I think it's going to be great. I'm really looking forward to it."

Wingate will start teaching winter semester with a class in machine learning and a class in programming languages. His research is centered on machine learning, or programming computers to find patterns and learn on their own.

"[It's] a really interesting and important topic right now because a lot of people have a lot of data, and they like to find patterns in it," said Wingate. "There's so much data that people can't look at it all by hand."

His main focus is making machine learning more accessible to the average person. Wingate also studies robotics and medical imaging.

Wingate said being at BYU again has brought back memories, from bad dates to classes with professors who still teach on campus. He has noticed a difference in campus from his other work environments.

"There's such an amazing spirit here at BYU and an amazing spirit on campus, and I missed that," Wingate said.

College Publications

Geological Sciences

[M.J. Dorais](#), "Exploring the mineralogical heterogeneities of the Louisville Seamount trail", *Geochemistry, Geophysics, Geosystems* (2015), Volume 16, pp. 2884–2899.

S.P. Phillips, [T.H. Morris](#), [D.G. Tingey](#), [D.L. Eggett](#), & Z. Wei, "Discriminant Analysis of Elemental Data to Differentiate Formations of Like Facies Vertically Across an Unconformity and Laterally Across a Paleotopographic Divide", *Journal of Sedimentary Research*, Volume 85, pp. 1293–1309.

Mathematics Education

M.D. Steele, [K.R. Johnson](#), S. Often, B.A. Herbel-Eisenmann, & C.L. Carver, "Improving instructional leadership through the development of leadership content knowledge: The case of principal learning in algebra", *Journal of Research on Leadership Education* (2015), Volume 10, Issue 2, pp. 127–150.

[K.R. Johnson](#), "Reconceptualizing 'activism': Developing a socially conscious practice with prospective White mathematics teachers", *Interrogating Whiteness and Relinquishing Power: White Faculty's Commitment to Racial Consciousness in STEM Classrooms* (2015), pp. 171–187.

B.A. Herbel-Eisenmann, [K.R. Johnson](#), S. Often, M. Cirillo, & M.D. Steele, "Mapping talk about the mathematics register in a secondary mathematics teacher study group", *Journal of Mathematical Behavior* (2015), Volume 40, pp. 29–42.

S.L. Stockero, L.R. Van Zoest, A. Rougee, E.H. Fraser, [K.R. Leatham](#), & [B.E. Peterson](#), "Uncovering teachers' goals, orientations, and resources related to the practice of using student thinking", *Proceedings of the 37th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (2015), pp. 1146–1149.

L.R. Van Zoest, S.L. Stockero, N.A. Atanga, [K.R. Leatham](#), [B.E. Peterson](#), & M.A. Ochieng, "Attributes of student mathematical thinking that is worth building on in whole class discussion", *Proceedings of the 37th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (2015), pp. 1086–1093.

[S.R. Jones](#), A. Dorko, "Students' understandings of multivariate integrals and how they may be generalized from single integral conceptions," *The Journal of Mathematical Behavior* (2015), Volume 40, Issue B, pp. 154–170.

Physics & Astronomy

M.B. Muhlestein, [K.L. Gee](#), [T.B. Neilson](#), & D.C. Thomas, "Evolution of the average steepening factor for nonlinearly propagating waves", *Journal of the Acoustical Society of America* (2015), Volume 137, Issue 2, pp. 640–650.

A.T. Wall, [K.L. Gee](#), & [T.B. Neilson](#), "Multisource statistically optimized near-field acoustical holography", *Journal of the Acoustical Society of America* (2015), Volume 137, Issue 2, pp. 963–975.

Statistics

S.P. Phillips, [T.H. Morris](#), [D.G. Tingey](#), [D.L. Eggett](#), & Z. Wei, "Discriminant Analysis of Elemental Data to Differentiate Formations of Like Facies Vertically Across an Unconformity and Laterally Across a Paleotopographic Divide", *Journal of Sedimentary Research*, Volume 85, pp. 1293–1309.

[D.A. Engler](#), T. Chitnis, & B. Healy, "Joint assessment of dependent discrete disease state processes", *Statistical Methods in Medical Research* (2015), pp. 1–17