

# FACULTY newsletter

CPMS Physical and Mathematical Sciences

## The Universe: Purposeful or Purposeless?



**Above:** Dr. Daniel Peterson spoke at this year's Summerhays lecture.

Can science prove that there's a God?

Former editor of the FARMS Review, Dr. Daniel Peterson, isn't sure about proof, but he thinks it can point in that direction.

"To say that there is no indisputable proof is not to concede, by any means, that there are no clues," said Peterson at last week's Summerhays Lecture.

Peterson, who teaches Islamic Studies and Arabic at BYU, spoke on God's place in ancient cosmologies throughout the centuries and how our current cosmology still leaves room for a God.

"To pre-modern thinkers, the order of the visible universe was clear evidence, almost self-evident proof, of divine design and providence," explained Dr.

Peterson.

Some of the scientific community had troubles accepting a belief in God ever since Newton seemed to show us that the Universe was run by a "remorseless chain of cause and effect operating under mathematically rigorous physical laws."

When Darwin showed us that life came about by what appears to be random circumstances, some may have thought that divine design was dead.

But Dr. Peterson and others think just the fact that we exist is so unlikely that it may be considered a clue to the existence of some Creator pulling the strings.

"It was interesting when he talked about the probability of us living in a

random universe and how small that probability was," said BYU student Hanna Abdo, a second-year MBA with a marketing strategy emphasis who attended the lecture.

Abdo is a secular humanist from Jordan and president of the Interfaith Club on campus, SHARE. Though he said it gave him something to consider, he's still not convinced. This doesn't bother Peterson.

"There isn't enough evidence to say scientifically that there is a God with absolute certainty," Peterson said. "There's only enough to make us wonder. Then it's up to us to decide what we believe."

## Developing a Taste for Research and Mini-Muffins



**Above:** *New assistant professor, Stacy Smith.*

The College of Physical and Mathematical Sciences welcomes Stacey Smith as a new assistant professor in the Department of Chemistry and Biochemistry.

Smith earned both her bachelor's and doctoral degrees from BYU in 2007 and 2012, respectively. While working on her PhD, she developed a taste for research, specifically in the structural

analysis of materials using X-ray diffraction, absorption, and scattering methods.

Following her PhD, Smith spent a year as a postdoctoral fellow at MIT where she pursued additional studies in X-ray crystallography.

Smith's interest in chemistry was peaked in high school and fostered through influential professors at BYU.

"I had really great AP chemistry and physics teachers in high school," she said. "Because I had enjoyed those subjects, I took chemistry my freshman year of college [and] did well in it, and my freshman chemistry professor offered me a job in undergraduate research. The rest is history."

Smith and her husband, Justin, have been married for seven years. They enjoy doing outdoor activities together, such as hiking, backpacking, camping, biking, and running.

"We like to do 5K races and have run the Wasatch Back Ragnar a few times," she said.

They also enjoy cooking together, singing in choirs, traveling, and photographing the interesting places they visit. When she is not outside, Smith enjoys reading, playing the piano, and baking.

"I particularly enjoy experimenting with mini-muffin recipes," she said. "My current favorite Stacey-original recipe is a banana-oatmeal-ginger muffin."

Although she admits that she is a little biased, Smith said she looks forward to working with the bright, highly motivated, and friendly students at BYU.

"I am also excited to teach in a place where faith and science are both encouraged; most of the rest of the world sees the two as conflicting opposites, but to me they are complementary," she said. "I relish the opportunity to share them both openly."

by Meg Monk

## Those Who Can, Teach

The College of Physical and Mathematical Sciences welcomes Steven Jones as a new assistant professor in the Department of Mathematics Education.

Jones graduated from BYU with bachelors and master's degrees in mathematics in 2005. He then received his PhD at the University of Maryland in curriculum and instruction with an emphasis in mathematics education in 2010.

Jones chose mathematics education because it combined his two favorite areas, mathematics and psychology.

"When I started learning more about the field of education, it was fascinating to me to think about how I think about mathematics," said Jones. "It startled me to realize I had previously, and erroneously, assumed that information somehow 'transmitted itself through the air' from teacher to students. It was fun to study how people's minds create new knowledge."

His love and fascination for teaching has continued to grow as he has interacted with students and faculty.

"I love for students to see that mathematics is a useful, applicable discipline, which is far more than a bunch of rules and procedures to be memorized," said Jones. "I enjoy helping them realize that the mathematics they are learning describes the world around us in a very powerful way."

Jones' research is focused on helping students see the connections of mathematics in the world, particularly their application of mathematics to science. His main focus is discovering how students understand Calculus topics in a way that helps them apply those principles to physics and engineering fields.

Jones came back to BYU as a professor because "I knew it would be a place where I would fit in, and that BYU would actually be interested in my success. I [also] love that the students are hard workers and that they care about

enriching their lives and the lives of those around them. It makes it a pleasure to teach them."

by Caroline Smith



**Above:** *New assistant professor, Steven Jones.*

# Announcements

## MEG Grant Proposal Deadline

Thursday, October 24th  
<http://orca.byu.edu/meg/DatesDeadlines.php>

## R&S Files Due in College

Friday, November 1st

# Upcoming Events

## Education in Zion Seminar

Josh Price of the Chemistry & Biochemistry Department will be giving a lecture on Wednesday, October 23 at 12:00 p.m. in B192 JSFB. The title of his lecture will be "Moving in His Majesty and Power: How Elements in Our World Inspire Reverence."

## Majors Fair

Wednesday, October 23rd

## College Christmas Luncheon

Friday, December 13th from 11:30a.m.- 1:30p.m. in ESC Pendulum Court

## Annual College Awards Banquet

Friday, January 24th from 6:00p.m.- 8:00p.m. in WSC Ballroom

## 2014 Student Research Conference (SRC)

Saturday, March 15th, JKB

# Turning Practicality into Passion

The College of Physical and Mathematical Sciences welcomes Ryan Farrell as a new assistant professor in the Department of Computer Science.

Farrell earned his bachelor's degree in electrical engineering and computer science from the University of California-Berkeley in 2001. He received his master's degree from the University of Maryland-College Park in 2006 and then stayed at Maryland to earn a PhD in 2011. His doctoral studies were in the area of activity and object recognition, focusing on computational approaches to precisely classify objects such as the classification of birds to their individual species or cars to their make and model.

Farrell received a postdoctoral fellowship from the International Computer Science Institute at UC Berkeley in 2011, and continued there as a research scientist until accepting a position at BYU.

Farrell had been interested in math, science, and computers since he was very young, but choosing computer science as a career began as a matter of practicality.

"When I was applying to college, I had heard that electrical engineering and computer science were the most difficult majors to transfer into, so I figured I'd start there and have an easy time switching majors if needed," he said. "From day one at Berkeley, however, I loved computer science."

Conducting research as an undergraduate and teaching as a missionary in Brazil led him to decide he would go to graduate school to become a professor.

"I want to be a teacher who helps to instill in students a passion for computer science and to mentor students as we conduct innovative research together," he said.

Farrell looks forward to being engaged within the department and in the academic research community, but most of all, he desires to become an influence for good.

"One of the things that I most look forward to is spending time with students, particularly one-on-one, helping to strengthen them, not just academically, but helping them grow spiritually and building character," he said.

Understanding that teaching at BYU affords very special opportunities not

only to its students but also to its professors, Farrell said, "The bottom line is that I'm here to serve the Lord in whatever capacities He would have me. . . . I will strive to first and foremost help my students have the right priorities and perspective in life and to bind themselves to Christ, and second [to] help prepare them for a successful career."

Farrell met his wife, Sally, early in high school where they both joined The Church of Jesus Christ of Latter-day Saints through the influence of good friends. Shortly after serving overlapping missions, they were married in the Oakland California Temple. They have two sons and a daughter.

In his spare time, Farrell enjoys birding and playing basketball, but he loves spending time with his family the most. They enjoy hiking, playing sports, and reading together, and are looking forward to new opportunities in Utah.

"We are very excited to come to Provo and join the BYU community!"

by Meg Monk



**Above:** New assistant professor, Ryan Farrell.



# College Grants

## Chemistry & Biochemistry

[Jaron Hansen](#)

Sponsor: Sunset Laboratory Inc.

Title: A Semi-continuous Monitor for the 1-hr Determination of Organic Marker Compounds

[Matt Linford](#)

Sponsor: Moxtek

Title: Wire-grid Polarizer Passivation

## Computer Science

[Kevin Seppi](#), [Jeff Humpherys](#), [Tyler Jarvis](#), [Richard Evans](#)

Sponsor: NSF

Title: TUES: A New Curriculum in Applied and Computational Mathematics

[Sean Warnick](#), [Daniel Zappala](#)

Sponsor: Department of Homeland Security

Title: Attack Modeling for Distributed Decision Architecture

## Geological Sciences

[Summer Rupper](#)

Sponsor: NSF

Title: Climate and Glacier Change in Bhutan: The Last Millenia, Present and Future

## Mathematics

[Jeff Humpherys](#), [Tyler Jarvis](#), [Kevin Seppi](#), [Richard Evans](#)

Sponsor: NSF

Title: TUES: A New Curriculum in Applied and Computational Mathematics

[David Wright](#)

Sponsor: Common Core Inc.

Title: Race to the Top Consultant for State of New York - Math Curriculum planning

[Rodney Forcade](#), [Gus Hart](#)

Sponsor: Duke University (ONR)

Title: Topological Decompositions and Spectral Sampling Algorithms for Element Substitution in Critical Technology

## Physics & Astronomy

[Gus Hart](#), [Rodney Forcade](#)

Sponsor: Duke University (ONR)

Title: Topological Decompositions and Spectral Sampling Algorithms for Element Substitution in Critical Technology

## Love at First T-Test

The College of Physical and Mathematical welcomes Matthew Heaton as an assistant professor in the Department of Statistics.

Heaton received both his bachelor's and master's degrees in statistics from BYU in 2006 and 2007. For his PhD from Duke University (2011), Heaton studied kernel averaged predictors for space and space-time processes.

Following the completion of his doctorate degree, Heaton worked as a post-doctoral scientist for the National Center for Atmospheric Research in Boulder, Colorado.

Heaton became interested in statistics through what could be called an accident, but what Heaton describes as divine intervention. Because of a new job he got his sophomore year at BYU, he was forced to rearrange his class schedule.

"In this rearranging, I had time to take one more class, and the Introduction to Statistics class was the only one that would simultaneously fit in my schedule and help me progress towards graduation, so I signed up," he said. "From there, I like to say that it was 'love at first t-test.'"

Heaton loved the idea of using data to answer difficult questions and believes strongly that education should be used to make society a better place. Because of this ideal, he sought to find a research area that would reflect that goal.

"During my second year of graduate school, I got involved in a research study looking at drug abuse patterns across the United States. As part of this project, it was our goal to identify regions of high drug abuse in order to establish intervention programs. From this project, I saw firsthand how statistics can be used to answer questions that lead to an improved society," he said.

As a teacher, Heaton hopes to change negative attitudes toward statistics and teach his students that being able to learn from data is an invaluable skill that will aid them in any field of study and throughout their lives.

"Whenever I tell people that I am a statistician, the usual response is 'I hated that class' or 'That was the hardest class I ever took.' I hope to show my students that statistics is fun because it is challenging," he said.

Heaton and his wife have been mar-

ried for nine years and have three children, ages six, three, and three months. They enjoy swimming, hiking, and spending time together at home. When he is not with his family, Heaton enjoys playing tennis and skiing.

Having been a student at BYU, Heaton looks forward to once again enjoying the spirit of this university.

"Through graduate school and a post-doctoral research fellowship, I have had the chance to work with students and faculty from all over the world," he said. "While there are wonderful people everywhere, BYU has a remarkably high concentration of some of the best students and faculty that I know."

by Meg Monk



**Above:** New assistant professor, Matthew Heaton.

# College Publications

## Chemistry & Biochemistry

K. Liu, P. Aggarwal, [J.S. Lawson](#), [H.D. Tolley](#), [M.L. Lee](#), "Organic monoliths for high-performance reversed-phase liquid chromatography", *Journal of Separation Science*, 2013, volume 36/issue 17, pp. 2767-2781.

B.J. Hansen, R.J. Niemi, A.R. Hawkins, S.A. Lammert, [D.E. Austin](#), "A Lithographically Patterned Discrete Planar Electrode Linear Ion Trap Mass Spectrometer", *Journal of Microelectromechanical Systems*, 2013, volume 22/issue 4, pp. 876-883.

R.M. Taylor, J. Dance, R. Taylor, [J.T. Prince](#), "Metriculator: quality assessment for mass spectrometry based proteomics", *Bioinformatics*, 2013, pp. 1-2.

## Geology

[J. Radebaugh](#), "Dunes on Saturn's moon Titan at the end of the Cassini Equinox Mission," *Aeolian Research*, volume 11, pp. 23-41.

L. Burgener, [S. Rupper](#), L. Koenig, R. Forster, [W. F. Christensen](#), J. Williams, M. Koutnik, C. Mieke, E. Steig, D. Keeler, L. Riley, "An observed negative trend in West

Antarctic accumulation rates from 1975 to 2010: evidence from new observed and simulated records," *Journal of Geophysical Research-Atmospheres*, 2013. volume 118, pp. 4205-4216, doi: 10.1002/jgrd.50362

## Mathematics

[W. Barrett](#), N. Malloy, C. Nelson, W. Sexton, J. Sinkovic, "Diagonal Entry Restrictions in Minimum Rank Matrices," *Electron. J. Linear Algebra*, 2013, volume 26, pp. 300-332.

[M. D. Barrus](#), "Hereditary Unigraphs and Erdős-Gallai Equalities," *Discrete Mathematics*, 2013, volume 313/issue 21, pp. 2469-2481.

[J. C. Dallan](#), M. Scott, [W. V. Smith](#), "A Force Based Model of Individual Cell Migration with Discrete Attachment Sites and Random Switching Terms," *Journal of Biomechanical Engineering*, 2013, volume 135/issue 7, pp. 071008-1-071008-10.

## Statistics

B. W. Bailey, M. Allen, M. Hill, J.D. LeCheminant, [W.F. Christensen](#), "Objectively

measured sleep patterns in young adult women and the relationship to adiposity," *American Journal of Health Promotion*, 2013

K. Liu, P. Aggarwal, [J.S. Lawson](#), [H.D. Tolley](#), [M.L. Lee](#), "Organic monoliths for high-performance reversed-phase liquid chromatography", *Journal of Separation Science*, 2013, volume 36/issue 17, pp. 2767-2781..

L.N. Long, [W.F. Christensen](#), "When justices (subconsciously) attack: The theory of argumentative threat and the Supreme Court," *Oregon Law Review*, 2013, volume 91, pp. 933-959.

L. Burgener, [S. Rupper](#), L. Koenig, R. Forster, [W. F. Christensen](#), J. Williams, M. Koutnik, C. Mieke, E. Steig, D. Keeler, L. Riley, "An observed negative trend in West Antarctic accumulation rates from 1975 to 2010: evidence from new observed and simulated records," *Journal of Geophysical Research-Atmospheres*, 2013. volume 118, pp. 4205-4216, doi: 10.1002/jgrd.50362.

[M.J. Heaton](#), R.D. Peng, "Extending Distributed Lag Models to Higher Degrees," *Biostatistics*, 2013, doi: 10.1093/biostatistics/kxt031.