

# FACULTY newsletter

CPMS Physical and Mathematical Sciences



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ABOVE Dr. John Lamb

## John Lamb Continues to Serve the University

A jack-of-all-trades, John Lamb of the Department of Chemistry and Biochemistry has left his mark all over BYU campus. Now as associate chair of his department, he will continue adding more experience to his long history of service to the university.

For Lamb, it is the variety of his career that has made it so rich and enjoyable. First coming to BYU in 1984, he accepted a joint appointment as a chemistry professor and as the executive director of what is now called the Office of Research and Creative Activity (ORCA). He hit the ground not only running, but sprinting.

At the time, there was no real avenue for professors to patent their newly discovered technologies. The only existing documents of such legal transactions were housed in a filing folder thick with jumbled papers.

"It was like Pandora's box because it contained a lot of information about patentable and licensable technolo-

gies that really hadn't been exploited," Lamb said.

Taking charge, he plowed through the material and helped to develop policies for marketing technologies developed at BYU. The group he organized to manage the new system evolved into the Office of Technology Transfer. Today, this office continues to provide an invaluable service to faculty, staff and students by handling the business and legal aspects of the commercialization process.

After eight years, Lamb became a full-time professor and dedicated more time to researching better ways for disposing nuclear waste. His research, funded by the US Department of Energy, involved donut-shaped compounds called macrocycles.

Macrocycles exhibit a behavior commonly known as the goldilocks principle, basically meaning that an atom just the right size will fit into its donut-like cavity and get stuck. Leveraging this

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BYU Photo

ABOVE Michael Bahr, statistics alumnus

## A Statistical Analysis of Health Care Reform

Want to know more? For full video of Michael Bahr's lecture and a podcast interview, please visit [cpms.byu.edu/michael-bahr-alumni-lecture-health-care](http://cpms.byu.edu/michael-bahr-alumni-lecture-health-care).

Michael D. Bahr, a BYU alumnus with both a bachelor's and a master's degree in statistics, has been chosen as one of BYU's 2011 Honored Alumni for demonstrating excellence and success in the professional world. He spoke on campus last month and explained how recent health care reform will affect the health industry.

Bahr has been an actuary in the health care industry for over 25 years. His love for problem solving and his ability to explain difficult concepts have made him extremely successful in his field. With his extensive understanding of the health and medical industry, Bahr described the anticipated effects of recent health reform.

He explained that there are parts of the health reform bill that are good, which have been a long time coming. For example, there are parts of the bill that make health plans responsible for

quality of care and outcomes for patients.

"The thing that's going to be interesting is how the dynamics of health care are going to change," Bahr said. "You'll end up with two or three players in the market, and they'll probably end up being regulated differently. That changes it significantly from a competitive model like you have today."

During the lecture, Bahr explained a few of the many factors that have driven up the cost of health care. Over the last several decades, many prescription drugs that maintain or cure disease have been developed. Medical procedures that significantly increase the quality and longevity of life have also been developed. Since health care costs grow significantly with age, longer life spans lead to significant additional health care costs. The cost of longer life is in addition to the costs for develop-

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## The Next Best Thing to Having Science Skills

Unfortunately, many CPMS students leave college without the skills they need to thrive in their professional careers. Despite being great scientists, students need something more—business smarts.

This next semester, CPMS will be offering a course in business practices that is designed to make sure that students have the know-how needed to have a successful career after graduation.

The 1.5 credit course, Career Essentials, is listed under each department as course number 500 and is currently called Business Practices.

The course offers a hands-on mentored approach, according to Melissa Wallentine, a faculty member in the Marriott School of Business who will be teaching the course.

"[Students] will work in teams on a project that is business oriented," she said, "and they will do it with the help of several business faculty members who will teach them project management, financial and accounting considerations, and business language. These faculty members are highly qualified and interesting, so they won't be bored."

The other instructors and guest lecturers of the course include Thomas Murray, a retired senior propulsion engineer; Ernie Nielsen, from the BYU Office of Information Technology; and Earl Stice, a BYU professor of accounting.

With this all-star lineup, students will learn "how to get a whole picture of a project, how to understand the financial

angles, how to present their portions in a professional manner and how to intelligently contribute to the conversations that determine the direction projects will go," according to Wallentine.

The deans of the college ask all faculty members to encourage their students to enroll in the course.

"Being a good scientist is often not enough to succeed in the business world," said Associate Dean Bart Kowallis. "Students need to have a knowledge of the business world and an interest in the success of the company they work for."

"Once you leave college and enter the business world, you may be surprised at how little you know about how a business works and thrives," he said. "This class gives you a few fundamentals that can help ease the transition from college into business or industry."

Because all employers are tied to businesses in some sense, students shouldn't graduate with the mistaken idea that they will only work in "pure science." Everyone will interact with business on some level during his or her career.

"If you don't know anything but your own specialty, you will have no input in these meetings and decisions," Wallentine said.

The course is listed as Business Practices under course number 500 in each department of the college, e.g. CS 500, GEOL 500, etc. It will be held on Tuesdays from 4-5:20 p.m.

by: Katie Pitts

## Health Care Reform continued from page 1

ing the new procedures and drugs.

To control health costs, the pool of participants needs to be as large as possible – ideally including everyone. However, under the current health care plan, companies have the ability to opt out of the government regulated health plan and set up a self-funded insurance plan for their employees. In some cases, particularly for large corporations, it is advantageous to choose to fund their own plan because it will cost less. This will take large segments of participants out of the general pool, with the effect that insurance costs will be driven up for everyone else.

"People are going to make the decision that's going to serve their interests best," Bahr said. "In this piece of reform, you've created an environment where those who game [the system]

come out way ahead, and those who don't have that ability end up paying the price."

He said parts of the reform bill cut administrative and marketing costs for insurance companies. For example, there won't be an underwriting process anymore; all insurance companies will offer the same types of health plans. At the same time, insurance companies will be governed by a board outside the company, made up of board members who, in many cases, have no background in the medical field.

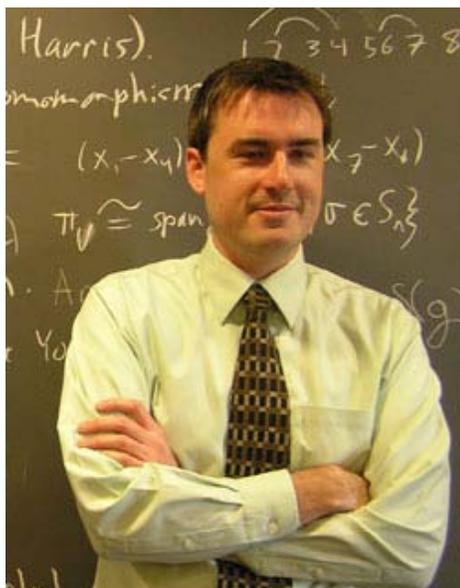
"What's going to end up happening is if [insurance companies] can't be big, [they're] not going to be in [it] at all," Bahr said. "In most markets, you're going to have fewer carriers than you have today."

by: Erik Westesen

## Dates to Remember

College Christmas Luncheon  
Friday, Dec. 9, 11:30 a.m.  
ESC Pendulum Court

Annual Awards Banquet  
Thursday, Jan. 19, 6 p.m.  
WSC Ballroom



ABOVE Dr. Matthew Housley

## New Faculty Spotlight: Matthew Housley

The College of Physical and Mathematical Sciences welcomes Matthew Housley, a visiting assistant professor in the Department of Mathematics.

Professor Housley received his bachelor's degree in physics at BYU before pursuing a master's degree in physics at UC Santa Barbara. He also received a master's degree in mathematics at BYU and recently completed a PhD program in mathematics at the University of Utah.

Housley is excited to return to the roots of his undergraduate education. He looks forward to working with students in undergraduate mentored research. Participating in research as an undergraduate student at BYU was influential in his decision to attend graduate school and provided a good foundation for his future career.

"I had a really great experience as an undergraduate student doing mentored research," Housley said. "Hopefully, I can do the same kind of thing teaching here. I think in general, if you just take classes in your undergraduate education, then sure it's preparation for jobs, but actual practicum is much better preparation."

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characteristic, Lamb's group identified those macrocycles whose holes were the proper size for the most radioactive and dangerous by-products of nuclear waste, like cesium and strontium. For the last 19 years, Lamb has edited a scientific journal focused on these compounds.

In related work, Lamb's group used these macrocycles as the basis for separating dissolved metals and other materials. Dionex Corporation has funded this research for over 25 years.

In spite of all these accomplishments, Lamb still considers teaching to be "the most important component of [his] work."

For eight years, he served as an associate dean of general education. In conjunction with this service, he continues to feel a particular responsibility toward incoming freshmen. For him, the most challenging aspect of teaching beginning chemistry classes has been the many different backgrounds students bring with them.

"Many have had AP Chemistry in high school," he said. "Others have had no chemistry at all. You have to try to serve the needs of all these people,

covering a huge amount of material in a very short time."

To solve this inequality, Lamb developed ChemTutor. This multimedia resource has twenty-four modules that review very basic chemistry ideas. Students are required to complete a module before each class, better preparing them to spend valuable lecture time digging into college-level material.

ChemTutor has proven so valuable for students that five other BYU professors are using his online program. It has also been translated into Japanese for use at Osaka City University.

Lamb was also partially responsible for the creation of today's recitation sections. His practice of dividing students into small formal study groups has spread to chemistry classes for non-major students. Now the university schedules many large chemistry lecture classes with small recitation labs guided by TAs.

Throughout Professor Lamb's career of university service, it's the one-on-one interactions that have been the highlight of his career.

"I enjoy [teaching] the most, frankly, of all the things that I do," he said.

by: Chris Scheitinger

by: Natalie Rice



BYU Photo

**ABOVE** Dr. Emily Evans

## New Faculty Spotlight: Emily J. Evans

The College of Physical and Mathematical Sciences welcomes Emily Evans, a visiting assistant professor in the Department of Mathematics.

Professor Evans received her bachelor's degree in economics from the University of Utah. Following graduation, she moved to Massachusetts and worked as a software engineer at EMC, Lavastorm and Hewlett-Packard. Evans recently completed a PhD program in mathematical science at the Worcester Polytechnic Institute.

Now at BYU, Evans looks to strengthen her role as a teacher and continue her research in finite element and extension theories. She enjoys the creativity surrounding mathematics and is excited for future opportunities to investigate unexplored areas.

"It's a very creative field; it lets you try new things," Evans said. "I've always loved math because I love patterns, and there's a beauty in the patterns of math that once you really start to understand the math, then you start to see these pat-

terns repeated over and over again."

Evans also studies problems concerning domains with fractal boundaries. This research explores using self-similar sets to better model physical processes such as erosion and wind patterns over mountains. Evans believes that by using fractals, biologists and engineers will be able to improve the accuracy of physical models in the future.

Professor Evans is married to David Evans, an electrical engineering graduate from BYU. They have a three-year-old daughter, Eleanor, who also likes to do math just like her parents. When not doing research, Evans enjoys reading and riding her Xooter, a full-size self-propelled scooter.

Evans is currently teaching Honors Calculus 1 and Theory of Analysis 2 and is looking forward to involving undergraduate students in mentored research in the future.

by: Chris Scheitinger



Math Ed Dept

**ABOVE** Dr. Dawn Teuscher

## New Faculty Spotlight: Dawn Teuscher

The College of Physical and Mathematical Sciences welcomes Dawn Teuscher as an assistant professor in the Department of Mathematics Education.

Professor Teuscher received her bachelor's degree in mathematics education at BYU. While teaching high school mathematics, she attended the University of Utah and received a master's degree in sports psychology. After teaching for ten years, she moved to Missouri, where she completed a PhD program in mathematics education at the University of Missouri.

She has taught both at the high school and the collegiate level, spending ten years teaching at American Fork High School and Lone Peak High School, and three years teaching at Arizona State University.

Teuscher pursued her PhD in an effort to ultimately impact more teachers and students in improving mathematics education.

"I think that's my biggest goal: just to be an influence to help teachers change their practice out in the schools, so that we can teach mathematics to kids in a better way, but also to help our students actually learn mathematics," Teuscher said.

Professor Teuscher is currently researching teacher education, student understanding and federal policy (Common Core Standards for Mathematics). She is currently involved with a National Science Foundation grant that focuses on how teachers implement a new conceptually oriented precalculus curriculum with students. She hopes the curriculum will help precalculus students achieve a sufficient understanding to empower them to advance in mathematics.

"One of the big things at the college level is that kids come in unprepared, and they'll take precalculus, and then they quit," Teuscher said. "Our hypothesis is that they don't understand the foundational concepts that are taught in precalculus, or that should be taught in precalculus, so that when they get to calculus, it actually makes sense."

Teuscher enjoys real-life applications of mathematics and is currently teaching secondary math education courses. She has seven siblings and 18 nieces and nephews. She also served a mission in Honduras and Guatemala. When not working, she enjoys photography, running, skiing and spending time outdoors.

by: Chris Scheitinger

# FAC Website

<http://fac.byu.edu/>

The Faculty Advisement Council has recently created a website that includes proposals from last year, the list of representatives from the colleges and an area where faculty can make suggestions to the FAC.

We encourage faculty to take advantage of this great resource, which will help the FAC better represent the members of the college.

Questions? Contact your representatives: David Dearden ([david\\_dearden@byu.edu](mailto:david_dearden@byu.edu)) and Mike Goodrich ([mike@cs.byu.edu](mailto:mike@cs.byu.edu)).

# College Publications

## Chemistry and Biochemistry

L. Bhuiyan, [D. Henderson](#), "Evidence for a Second, Local Contact Condition for a Planar Electric Double Layer Containing Size and Valency Asymmetric Ions", *Molecular Physics*, 2011, volume 109/number 15, pp. 1863-71

C. Ellis, [D. Ess](#), "Computational Study on the Mechanism and Selectivity of C-H Bond Activation and Dehydrogenative Functionalization in the Synthesis of Rhazinilam", *The Journal of Organic Chemistry*, 2011, volume 76/issue 17, pp. 7180-85

[D. Henderson](#), "Some Simple Results for the Properties of Polar Fluids", *Condensed Matter Physics*, 2011, volume 14/no. 3, pp. 1-6

D. Jensen, V. Gupta, R. Olsen, A. Miller, [R. Davis](#), [D. Ess](#), Z. Zhu, M. Vail, A. Dadson, [M. Linford](#), "Functionalization/Passivation of Porous Graphitic Carbon with Di-tert-amylperoxide", *Journal of Chromatography A*, 2011, volume 1218/issue 46, pp.8362-69

J. Lattin, [D. Belnap](#), W. Pitt, "Formation of eLiposomes as a Drug Delivery Vehicle", *Colloids and Surfaces B: Biointerfaces*, 2011, volume 89, pp. 93-100

J. Lin, N. Cheng, D. Filman, A. Steven, J. Hogle, [D. Belnap](#), "An Externalized Polypeptide Partitions between Two Distinct Sites on Genome-Released Poliovirus Particles", *Journal of Virology*, 2011, volume 85/number 19, pp. 9974-83

Y. Peng, [D. Austin](#), "New Approaches to Miniaturizing Ion Trap Mass Analyzers", *Trends in Analytical Chemistry*, 2011, volume 30/issue 10, pp. 1560-67

Y. Peng, B. Hansen, H. Quist, Z. Zhang, M. Wang, A. Hawkins, [D. Austin](#), "Coaxial Ion Trap Mass Spectrometer: Concentric Toroidal and Quadrupolar Trapping Regions", *Analytical Chemistry*, 2011, volume 83/issue 14, pp. 5578-84

[J. Price](#), E. Powers, J. Kelly, "N-PEGylation of a Reverse Turn Is Stabilizing in Multiple Sequence Contexts, Unlike N-GlcNAcylation", *ACS Chemical Biology*, 2011

[J. Price](#), D. Powers, E. Powers, J. Kelly, "Glycosylation of the Enhanced Aromatic Sequon is Similarly Stabilizing in Three Distinct Reverse Turn Contexts", *Proceedings of the National Academy of Sciences of the United States of America*, 2011, volume 108/issue 34, pp. 14127-32

M. Wang, H. Quist, B. Hansen, Y. Peng, Z. Zhang, A. Hawkins, A. Rockwood, [D. Austin](#), [M. Lee](#), "Performance of a Halo Ion

Trap Mass Analyzer with Exit Slits for Axial Ejection" *Journal of the American Society for Mass Spectrometry*, 2011, volume 22/number 2, pp. 369-78

Z. Zhang, H. Quist, Y. Peng, B. Hansen, J. Wang, A. Hawkins, [D. Austin](#), "Effects of Higher-Order Multipoles on the Performance of a Two-Plate Quadrupole Ion Trap Mass Analyzer", *International Journal of Mass Spectrometry*, 2011, volume 299/issue 2-3, pp. 151-57

## Computer Science

J. Lee, [C. Giraud-Carrier](#), "A Metric for Unsupervised Metalearning", *Journal of Intelligent Data Analysis*, 2011, volume 15/issue 6

## Mathematics

D. Fearnley, [L. Fearnley](#), "On Dense Embeddings into Moore Spaces with the Baire Property", *Bulletin of the Australian Mathematical Society*, volume 83, 2011, pp.1-10

[P. Jenkins](#), J. Rouse, "Bounds for Coefficients of Cusp Forms and Extremal Lattices", *Bulletin of the London Mathematical Society*, 2011, volume 43/issue 5, pp. 927-38

[T. Ouyang](#), D. Yan, "Periodic solutions with alternating singularities in the collinear four-body problem", *Celestial Mechanics and Dynamical Astronomy*, 2011, volume 109/issue 3, pp. 229-39

## Mathematics Education

[K. Leatham](#), [B. Peterson](#), S. Stockero, L. Van Zoest, "Mathematically Important Pedagogical Opportunities", *Proceedings of the 33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, University of Nevada, Reno, 2011, pp. 268-75

H. Lee, S. Driskell, S. Harper, [K. Leatham](#), G. Kersaint, R. Angotti, "Prospective Teachers' Use of Representations in Solving Statistical Tasks with Dynamic Statistical Software", *Proceedings of the 33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, University of Nevada, Reno, 2011, pp. 268-75

## Physics and Astronomy

D. Jensen, V. Gupta, R. Olsen, A. Miller, [R. Davis](#), [D. Ess](#), Z. Zhu, M. Vail, A. Dadson, [M. Linford](#), "Functionalization/Passivation of Porous Graphitic Carbon with Di-tert-amylperoxide", *Journal of Chromatography A*, 2011, volume 1218/issue 46, pp.8362-69