

# FACULTY newsletter

CPMS Physical and Mathematical Sciences



Elise Boucher

ABOVE Dr. James Cannon

## Veteran Prof Shares 44 Years of Experience

After 44 years of teaching, Professor James Cannon still loves mathematics and his students just as much as the day he began.

Cannon taught classes as a graduate student at the University of Utah and continued teaching for 17 years at the University of Wisconsin before coming to BYU in 1986. During his teaching career, Cannon has taught most types of undergraduate and many graduate mathematics courses.

Cannon developed an interest in math at a young age when his college-aged brother took a topology class and shared his love of mathematics with his younger brother.

"He came home and told me about space filling curves and different infinities, and I thought they were wonderful," he said. "In high school, my parents gave me E. T. Bell's Men of Mathematics that had all of these romantic figures of the past doing hard things that had amazing consequences. Their mathematics had magic in it."

Although mathematics came naturally to him, he said he has met many peo-

ple who are smarter and quicker than he is, and he has run into problems that are harder than he can solve.

"And I've enjoyed both the smart people and the hard problems," he said.

Cannon said he likes the challenge of explaining difficult concepts to students.

"I try to make things crystal clear," he said. "I want to tell people about those things that I find magical, and I like the response when I succeed at that. I like the interplay; I like the questions – I like the office hours."

Cannon credits "good students, good colleagues and a wonderfully supportive wife" for making his career in mathematics possible and enjoyable.

After his retirement in September, Cannon plans to continue his mathematics research, but also plans to devote more time to his many hobbies.

"I have things I want to write," he said. "Then there's church work, family history, more time to visit children and grandchildren, hiking, piano and reading. And then who knows what else will come up."

by: Stacie Carnley



Levi Price

ABOVE Conrad Monson

## New College Research Specialist to Connect Faculty with Funding Opportunities

Transitioning from the aerospace industry to academia is not a typical career change, but for Conrad Monson, it is exactly what he is experiencing as he begins working as BYU's recently hired research development professional.

This newly created position focuses on finding more funding opportunities and working as a liaison between research funding agencies and the college. By fostering relationships between funding groups and faculty, Monson will help faculty be more aware of funding opportunities and more successful in securing grants. An important component of his job is to assemble teams of researchers who can compete for large, interdisciplinary grants.

"The goals of this position are to elevate the level of funding and recogni-

tion of the research that's done here," Monson said. "It's not just bringing in funding, but it is also exposing different funding organizations to research at BYU . . . and to help form more research collaborations."

Monson, who received his BS and MS in zoology from BYU, earned his PhD in physiology at the University of California, Davis in 1983. He has since had a successful career in the aerospace industry, finding employment at exciting places like NASA and at large companies like Boeing and Northrop Grumman.

Even though he has been out of academics for nearly 30 years, Monson's real-world business experience and research development efforts in aerospace are important assets to his cur-

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BYU Photo

**ABOVE** Dr. Daniel Austin

## Building Small Tools for Big Adventures

With the ability to define the makeup of molecules and determine the mass of minuscule particles, mass spectrometers are particularly useful instruments. NASA hopes to more fully take advantage of these machines by expanding the mass spectrometer's area of operation — all the way to Mars.

By sending mass spectrometers on space missions, scientists could better identify planetary substances, increasing our understanding of the solar system and the universe at large. But getting these bulky instruments up there is a real issue. Faced with many obstacles, the national space program has turned to Professor Daniel Austin, of the Department of Chemistry and Biochemistry, for help.

In collaboration with Aaron Hawkins, a faculty member in the Fulton College of Engineering and Technology, Austin has spent the last five years under NASA funding, exploring different ways to miniaturize mass spectrometers. As laboratory mass spectrometers typically weigh hundreds of pounds, this is no easy task.

Diverging from the route many other groups have taken, Austin has opted to create an entirely new design instead of trying to make a scaled-down version of a standard instrument. Specifically, he has worked to develop a replacement for the large metallic components that create electromagnetic

fields within mass spectrometers.

"[They're] heavy, and [they're] fairly big," said Austin of these components in a regular mass spectrometer. To downsize the instrument, he's using micro-lithography on ceramic plates.

Lithography — a process that etches images onto smooth surfaces — has allowed Austin to develop 2D ceramic plates that can create electromagnetic fields with shapes similar to those produced using a much larger 3D instrument. Tiny ring patterns etched onto these wafer-thin plates serve as "independently adjustable electrode elements."

"We can put a different voltage on each one, and that's what allows us to shape the electric fields," Austin said.

Not only can this instrument keep up with other devices, but it is also able to create different shapes of fields no other instruments have yet been capable of producing.

Satisfied already with the results, Austin is excited to continue to explore these unexpected abilities of his ceramic plates. NASA is also pleased with the progress. Having already funded another three years of research, they express interest and confidence that Austin may have developed an instrument that could soon find itself sitting on a launch pad, ready to gather data from the far reaches of space.

by: Natalie Rice

## Conrad Monson continued from page 1

rent position. He is implementing some of what he learned from these organizations here on campus as he seeks out government and business grants for faculty research. However, since his position will focus on obtaining research funds, most of his new job here will be quite different from what he is used to.

Additionally, the BYU environment is a big change for Monson. "I was pretty impressed that many of the staff meetings started with a prayer," he said. "I've certainly never had that in the business world."

As the college's research development professional, Monson will work at identifying funding and developing grant proposal projects for both the College of Physical and Mathematical Sciences and the Ira A. Fulton College of Engineering and Technology.

"We plan to bring the decision makers at federal agencies and private industries to BYU so that they can come and see what's being done in the two colleges," Monson said.

This new job brings Monson and his wife from their previous home in Denver, Colo., putting them closer to four of their six children, as well as several grandchildren and other extended family. He is enjoying working with the CPMS faculty in the unique atmosphere BYU has to offer.

"When I left BYU 33 years ago, I thought it would be good to come back, and now that I am here, I remember how special this place is," he said.

Faculty members can contact Dr. Monson at [conrad\\_monson@byu.edu](mailto:conrad_monson@byu.edu), 801-960-8415, or at BYU extension 2-7722.

by: Alysa Hoskin

## Dates to Remember

### AUC College Meeting

Wednesday, Aug. 22  
10 a.m., W111 BNSN

### Learning Suite Training

Wednesday, Aug. 22  
1-2 p.m., 1149 TMCB

# College Grants

## Chemistry and Biochemistry

[Allen Buskirk](#)

Sponsor: Yale (NIH)

Title: Mechanisms of Ribosomal Reactions: Peptide Bond Formation, Peptide Release and mRNA Cleavage

## Mathematics

[Michael Dorff and Tyler Jarvis](#)

Sponsor: NSF

Title: MCTP: Center for Undergraduate Research in Mathematics

## Physics and Astronomy

[Ross Spencer and Steven Turley](#)

Sponsor: NSF

Title: REU Site: Physics Research at Brigham Young University

## Statistics

[David Engler](#)

Sponsor: NIH

Title: Novel Approaches for the Modeling of Disease Progression in MS

# Happily Ever Animating: Brent Adams

Fifteen years ago, if someone had told Brent Adams that he would be known as the “Walt Disney of BYU,” he would have said that person was dreaming. But that’s exactly what his students call him.

Even before he studied architecture at the University of Utah, Adams was always interested in design. After beginning his career at an architecture firm in Salt Lake City with an innovative computer that specialized in 3-D design, Adams began to love computer visualization. While teaching night classes on design at BYU, he decided to leave architecture for a short time to get his master’s of fine arts degree at the University of Utah.

“I realized there was a limit to how much architecture will use visualization, since it is mostly used for just floor plans,” Adams said. “I decided to get to know computer graphics better and then take what I learned there back into architecture.”

It was during this time that a special projects animation class was created at BYU at the request of several of Adams’s students. Long story made short, Adams never returned to architecture. Today, students in the animation major and students emphasizing in animation in the computer science major complete their projects in the Center for Animation.

Recently, the Center for Animation moved from the College of Engineering to the College of Physical and Mathematical Sciences in order to more closely align itself with the Department

of Computer Science.

As the program has grown, so has its success. Pixar, Sony, Disney, DreamWorks and Microsoft Games all send experienced personnel to BYU each semester to mentor students, and those students are advancing to exclusive internships and jobs at these and other top studios. Pixar officially mentors only one other program – CalArts, an arts school personally started by Walt Disney.

“It’s kind of a win-win situation,” Adams said. “They mentor our program, which makes us improve, which makes them more interested in us. Most major studios have about a dozen schools they mentor, and luckily we’re on all of [the studios’] lists.”

Gaining the attention of the top studios, winning more awards than any other animation program and receiving an impressive amount of internships have put BYU in its own category for animation programs. The Center for Animation only graduates about 30 students per year, while most animation programs are at private art schools, which can graduate hundreds annually.

Adams claims that another key to the Center for Animation’s success is working together in teams and sharing discoveries with one another.

“The fact is that students here are Relief Society presidents, Elder’s Quorum presidents and returned missionaries, so they just learn that they need to work with each other,” Adams said. “It’s typically not what education is about, but that’s what it is here.”

by: Alysia Hoskin



RIGHT Dr. Brent Adams



Jenny Spencer

**ABOVE** Students in the math student lounge study together

## BYU Calculus in the Sweet Sixteen

The Department of Mathematics was recognized in March by the biggest professional organization for teaching college-level mathematics: the Mathematical Association of America (MAA), which has over 25,000 members.

The MAA recently conducted a study of more than 200 college and university calculus programs nationwide and identified 16 of them as exemplary. BYU's introductory calculus course, Math 112, was listed in that elite group. The study involved interviewing students, tracking their progress and failures and identifying their feelings towards math as a result of the calculus courses.

"Brigham Young University has . . . demonstrated a notable measure of success with its calculus program, exhibiting results with its students that have stood out," said David Bressoud, former president of the MAA.

During the upcoming fall 2012 semester, the MAA will visit BYU and the other 15 recognized schools around the country to learn what makes their programs so outstanding.

"We have good faculty teaching our calculus classes, and that makes a big difference," said Jessica Purcell, professor and course coordinator. "But we also have really good students. You mix the two together, and you have a great program."

While other collegiate math programs are shrinking, BYU's is growing, and calculus classes are at the center of that growth. While 730 students were enrolled in Math 112 during fall 2010, that number jumped to 912 students in fall 2011.

"We've been putting a lot of effort into making math instruction better at BYU," Tyler Jarvis, Department of Mathematics chair, said. "This is just evidence that all that work is paying off. It's important to us that our students learn well, and it's gratifying to know that we're succeeding."

The department has also drawn national attention for its performance in the annual William Lowell Putnam Mathematical Competition, a national math contest hosted annually by the MAA. BYU's Putnam team placed 16th last year and 24th this year. However, the recognition for Math 112 means something different to the department because it impacts many more students and faculty.

"Thousands of students take our calculus classes, so doing an excellent job of teaching those classes makes a bigger difference in the lives of everyday students on campus than building a strong competition team," Dr. Jarvis said.

by: Chris Scheitinger

## College Publications

### Chemistry and Biochemistry

J. Ma, M. Esplin, C. Adair, L. Mason, [S. Graves](#). "Increasing Evidence for and Regulation of a Human Placental Endogenous Digitalis-Like Factor", *Reproductive Sciences*, 2012, volume 19/issue 4, pp. 437-48

### Computer Science

N. Toronto, [J. McCarthy](#). "Computing in Cantor's Paradise with Lambda-ZFC", *Eleventh International Symposium on Functional and Logic Programming (FLOPS)*, 2012

### Mathematics

[M. Dorff](#), M. Nowak, M. Woloszkiwicz, "Convolutions of Harmonic Convex Mappings", *Complex Variables and Elliptic Equations*, 2012, volume 57/issue 5, pp. 489-503

[M. Dorff](#), M. Nowak, W. Szapiel, "Typically Real Harmonic Functions", *Rocky Mountain Journal of Mathematics*, 2012, volume 42/issue 2, pp. 567-81