

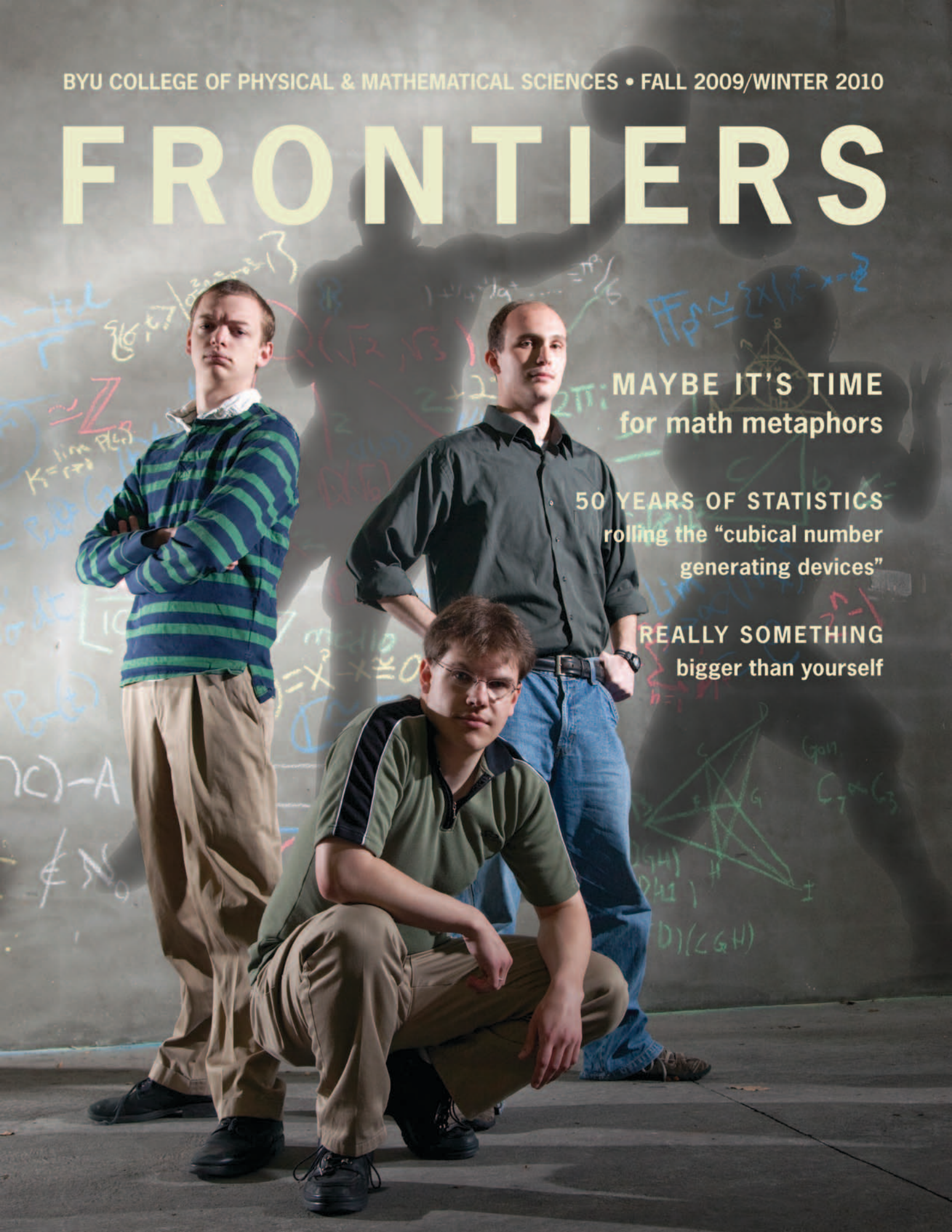
BYU COLLEGE OF PHYSICAL & MATHEMATICAL SCIENCES • FALL 2009/WINTER 2010

FRONTIERS

**MAYBE IT'S TIME
for math metaphors**

**50 YEARS OF STATISTICS
rolling the "cubical number
generating devices"**

**REALLY SOMETHING
bigger than yourself**



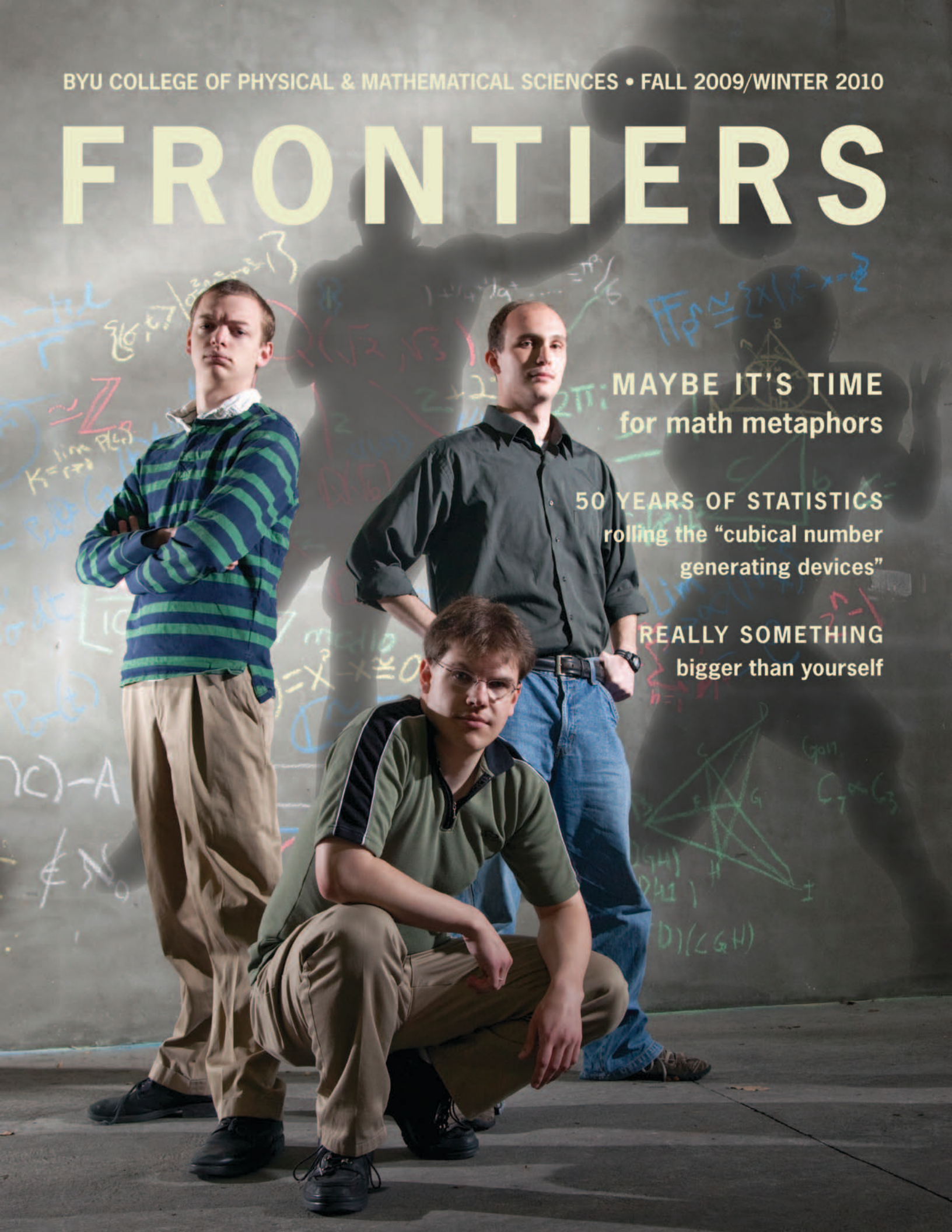
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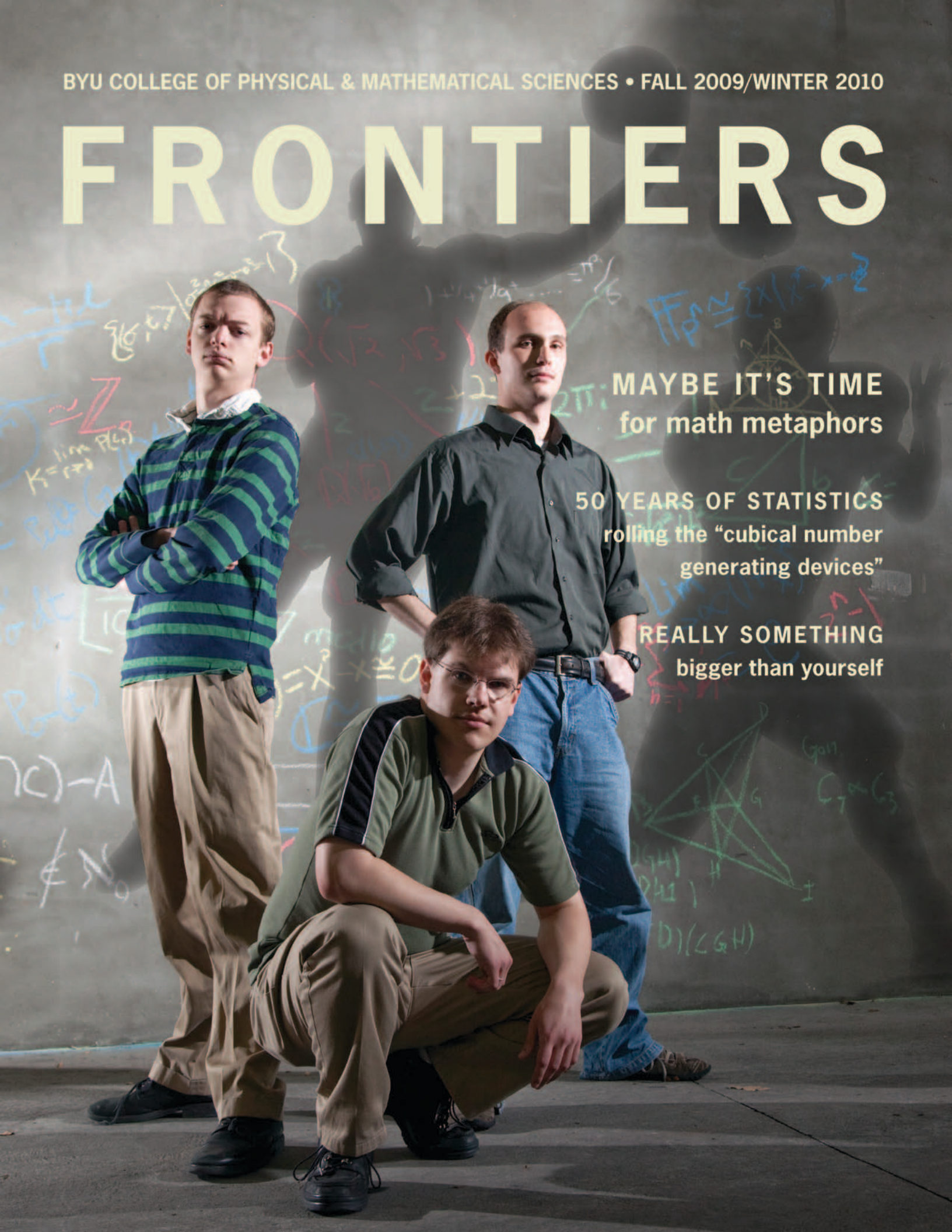
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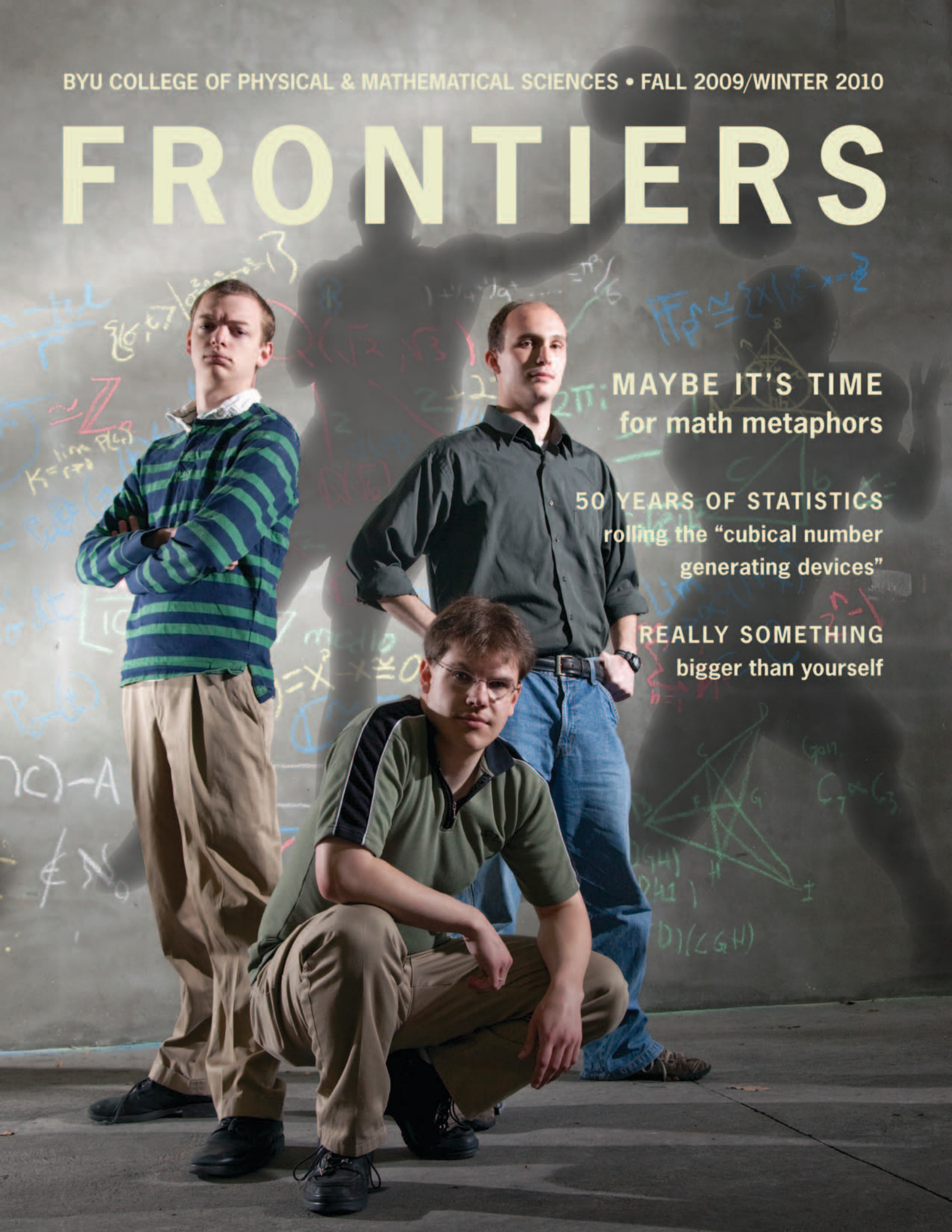
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DEAN'S MESSAGE



A new year is underway at BYU. There's a sense of renewal and excitement, as students and faculty look to past semesters with a sense of accomplishment and forward to new challenges with nervous excitement. This anticipation is often nurtured by the desire to do better this time.

This issue of *Frontiers* has a mix of the old and the new that helps me appreciate where we've been and generates enthusiasm for what lies ahead. We've benefitted greatly from the efforts of those who made the college what it is today. At the same time, we look forward to building on their efforts to strengthen the education of our students.

One of the significant changes in the dean's office is the recent retirement of Dana Griffen, who has served as Associate Dean for the past ten years. I suspect that many of you have associated with him over the years. His contributions, both in the Department of Geological Sciences and in the dean's office, are numerous. Among other responsibilities, Dana was the Editorial Director for *Frontiers* from its inception until now. Dana and his wife, Berva, plan to serve an LDS mission in the near future. We wish them well. Bart Kowallis, also from the Department of Geological Sciences, replaces Dana in the dean's office. We are excited to have him join us.

In this issue, we offer a brief history of the Department of Statistics, which celebrates its 50th anniversary this year. Although statisticians dealt with a relatively small number of fields in the early years of the department, the discipline has grown to where it touches almost every aspect of our lives. Likewise, our faculty members are involved in numerous and diverse research areas. We look forward to their contributions in this field over the next 50 years.

We also take a look at the Putnam Competition that the Department of Mathematics participates in each year. This national competition allows undergraduate students to test their mathematical skills against the best math students in the U.S. and Canada. Excitement for this competition has grown substantially over the past few years, as demonstrated by the dedication and performance of

our students. How well did they do this year? You'll have to read the article to find out—no spoilers here.

Finally, we have highlighted the accomplishments and contributions of several of our alumni. You may know one or more of them. We suspect that you're interested in knowing what happened to other classmates you have lost contact with. We are too, so we will be trying to highlight more alumni in future issues. We would like to hear from you and what is happening in your life, so please write us a letter or email (college@cpms.byu.edu) and bring us up-to-date. We will share your stories and the things you are doing as we are able to in future issues.

To help you stay better informed with what is happening in our college, we have initiated a monthly eNewsletter. In it, we'll keep you abreast of the happenings in the various departments and highlight other news and information you should find helpful. If you have not been receiving the eNewsletter, send us your current email address, and we'll add you to the distribution list.

Finally, in the context of old and new, I want to express appreciation to all of you who support the college—both those of you who were at BYU in the early years, as well as those who recently graduated. Enjoy this issue of *Frontiers*.

Scott D. Sommerfeldt

BYU COLLEGE OF PHYSICAL & MATHEMATICAL SCIENCES

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THOMAS W. SEDERBERG, Associate Dean
BART J. KOWALLIS, Associate Dean
E. DANIEL JOHNSON, Assistant Dean

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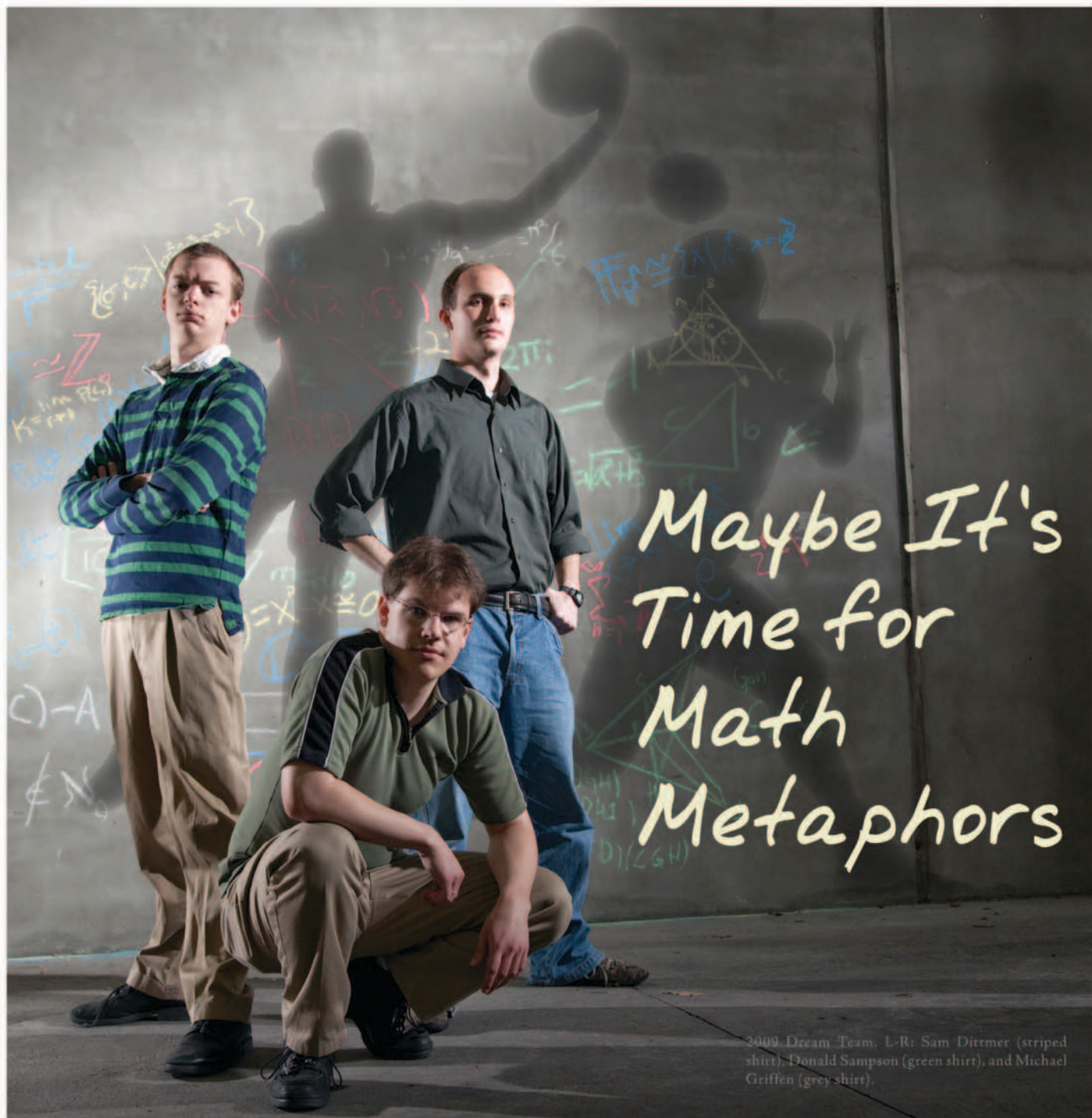
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2009 Dream Team, L-R: Sam Dittmer (striped shirt), Donald Sampson (green shirt), and Michael Griffen (grey shirt).

Writing about BYU's performance in recent Putnam Mathematical Competitions, it's hard not to resort to sports metaphors. After all, this year's team finished 23rd out of 404 collegiate teams from the U.S. and Canada. In contrast, BYU's

basketball team was nowhere to be found among the 43 teams who received votes in *USA Today's* final poll of 347 Division 1 teams, and though the football team was ranked 21st last year, that was out of a much smaller pool of just 246 teams. (As any math major with a calculator could tell you, the football team needed a ranking of 14 to equal the Putnam mathletes' performance. But who's cal-

culating?) And in the Holy War? BYU's team of Samuel Dittmer, Donald Sampson, and Michael Griffen beat the team up north in the Putnam Competition. To prepare for that contest, BYU hosted its own for in-state institutions, including the University of Utah. Not surprisingly, BYU won. "It's hard to say that it was a fair competition because it was ours," reports Professor Tyler Jarvis, chair of

FRONTIERS

FALL 2009/WINTER 2010



CONTENTS

- 2 **Maybe It's Time For Math Metaphors**
SCORING BIG IN THE PUTNAM MATHEMATICAL COMPETITION
- 4 **Rolling the "Cubical Number Generating Devices"**
50 YEARS OF STATISTICS AT BYU
- 6 [new] **College Volunteer Leadership Council**
GETTING DOWN TO THE BUSINESS OF SCIENCE, MATH, AND STATISTICS
- 7 [new] **Alumni News**
REALLY SOMETHING BIGGER THAN YOURSELF
- 8 **Friends of the College**
ED GHOLDSTON, MAKING A DREAM A REALITY
- 9 **Class Notes**



PRACTICE

To Stay on Top of Your Game, Practice At Least As Much As You Would If You Were Playing a Sport

the Department of Mathematics. “We hope to develop it into a much more competitive competition to prepare local teams to do better at the national level.”

According to Jarvis, the annual William Lowell Putnam Mathematical Competition is the main, if not the only, collegiate math competition in the country. It began in 1938, administered by the Mathematical Association of America. With one or two exceptions, BYU has fielded a team since 1965. The first team, coached by Professor Vencil Skarda, failed to rank. However, his 1979 team ranked 11th, BYU’s best performance to date. Professor Darrin Doud took over in 2002 and coached the team through 2007, after which Professor Tiancheng Ouyang took charge. “The competition focuses more on problem-solving ability,” Jarvis continues. “The problems don’t usually require a lot of advanced math, so even a freshman can understand the problems, and if they’re clever enough, they can solve them.”

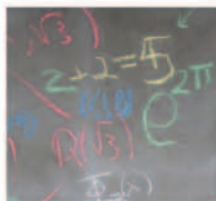
Take the problem of the circle and the hypercube, for example. It asked students in the competition to find the maximum diameter of a circle that could fit inside of a hypercube of side length 1. It’s a trivial problem in two dimensions—the answer is 1—but a hypercube has four dimensions; it doesn’t even exist in the real world. But there it was on the exam, a real brain stumper for almost everybody who took the exam, including Sam Dittmer, BYU’s much-heralded freshman and the state of Indiana’s first Mr. Math. “You can rotate the circle in the hypercube; you can sort of like turn it even more than in a regular cube, so you can get bigger and bigger circles, which is sort of a cool image to have in your head,” he explains. “So you can have circles infinitely large as long as you put them in enough dimensions. This was a problem I solved, I think, later.”

Sam can be excused for not being sure whether or when he solved that problem. The Putnam exam gives competitors six hours to solve 12 problems like that and to prove their answer—that’s just 30 minutes for each problem, with an hour thrown in

for lunch. Each problem is worth 10 points, with partial credit given for partial solutions. Most participants don’t come close to solving even one of the problems. In fact, this year the median score on the exam was just 1. According to junior Michael Griffin, who competed in his share of math competitions in high school, including the AMC and the AIME, “the Putnam is by far much harder. Much harder.”

He should know. This was his second year on the team. He scored 37 points in the 2005 competition—meaning he got three answers right, plus part of a fourth—then left on a mission. He returned after two years in Bangalore, India, and much like a rusty shooting guard might do, scored less than half that many points this time around. “If you really want to stay on top of your game, it takes at least as much practice as you put into learning an instrument or playing a sport,” he says.

Teammate Donald Sampson scored 30 points, finishing among the top 400 students on the exam. Drew Johnson, who took the exam but was not a team member, also finished among the top 400 students out of the 3,627 students who took the test. Sam Dittmer placed 54th and received honorable mention. “I’ve heard a rumor that only three people, out of the thousands and thousands of students who’ve taken the exam over 70 years, have earned a perfect score,” Sampson says.



GAME PLAN =

(Coaches Skarda, Doud, Ouyang) x (Top Recruits)

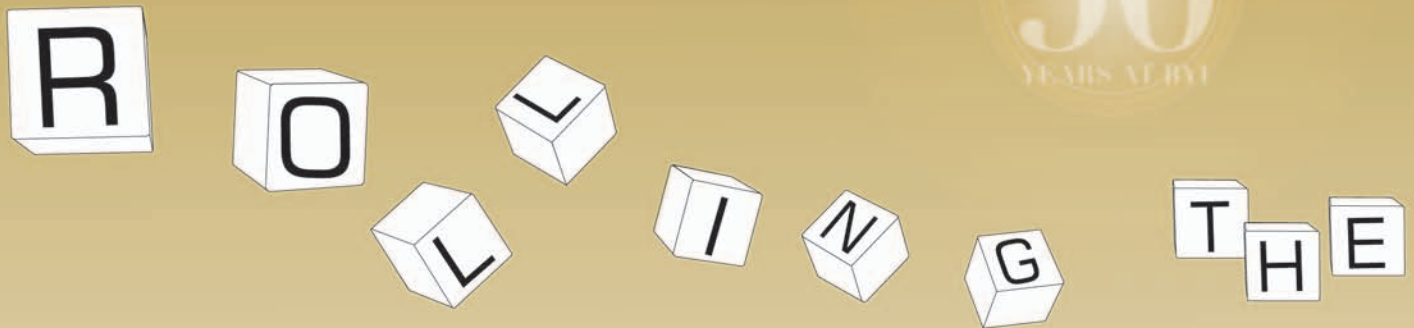
All this is good news for BYU’s math program, according to Professor David Wright, who recruits the best and brightest math students to Provo. Even as Samuel Dittmer leaves on a mission to Albania and Drew Johnson graduates, Wright has been busy “signing” Hiram Golze, the top math student in Utah, and Peter Baratta, a student from Massachusetts who has qualified for the United States Math Olympiad exam four years in a row. “These kids who compete in the Putnam are real scholars, and they really contribute to our math department,” he says. “The quality of our math degree



FULLY INVESTED

Our Goal Is To Be In The Top 10 and Do It Consistently

will improve over time now that we’re focusing on the competition.” How focused are they? “Our goal is to be in the top 10 and do it consistently,” he says. Sounds like he’s fully invested. ■



"CUBICAL NUMBER GENERATING DEVICES"

Over the 50 years it has been on campus, BYU's Department of Statistics has been the subject of its share of news stories. One story even made its way into *Reader's Digest*. It seems that the department wanted to buy some dice to help teach frequency prediction, the plotting of numbers to show the usable frequency between two points. Predictably, the purchase order for the tiny gambling devices didn't pass the smell test. Not to worry. Creative minds in the department changed a few words on the purchase order and voila! The purchasing office immediately approved the department's request to buy "cubical number generating devices." "People aren't naturally good at statistics," Professor H. Dennis Tolley says. "So operations based on uncertain outcomes bother a lot of people." Apparently the unknown purpose of the dice bothered a purchasing office employee.

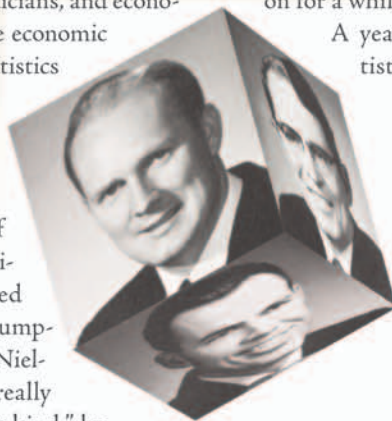
A relatively new science, modern statistics emerged in the early twentieth century as a way to help improve agricultural yields. It quickly became a tool that businessmen, mathematicians, and economists might use to analyze data or estimate future economic growth. "If you're a poet or a French horn player, statistics won't help you much," Tolley says. "But in nearly every other area of study it will." Because demographics is one of those areas, BYU has a statistics program today. It happened like this.

In 1956, Dr. Howard Nielson was the subject of an article in *Business Week* about his work for California-based Stanford Research. The article claimed that his recent statistical report on lumber consumption was "the most innovative study ever done." Nielson wasn't seduced by the accolades. "That didn't really mean anything because it was the first study of its kind," he says. "And when it's the first, of course it is the best!"

Nielson's humility notwithstanding, his report was innovative enough to catch the attention of Ernest L. Wilkinson, President of BYU. Wilkinson invited Nielson to come to Utah to study Church

population. "He called me up and started telling me about his church and how much he admired my work," Nielson reports. "I let him go on for a while before I told him I was a lifelong member."

A year later, Dr. Nielson was at BYU, teaching statistics in four different departments, including the



The original five statisticians. Left Die (L-R): Howard C. Nielson was joined by Melvin W. Carter, and H. Gill Hilton (bottom) in 1960. Right Die: In 1961, Dale O. Richards and J. Earl Faulkner joined the group. Carter was the first chair followed by Hilton, who served nine years, and Richards.

BYU STATISTICIANS HAVE BEEN QUANTIFYING AND ANALYZING VIRTUALLY EVERYTHING FROM ATHLETICS TO ZION FOR THE PAST 50 YEARS

departments of mathematics, economics, agriculture, and business management, as well as doing research on church population and growth. "Statistics departments weren't common in those days. People figured that the concepts could be covered in economics, business, and biology," Nielson recalls.

However, after two years of juggling teaching assignments in the four departments, he suggested creating a Department of Statistics, having observed the efficacy of such a department at the University of Idaho. Though his new department was initially a one-man show, within a few years the staff increased to 2.5—one professor spent half his time in the Business Management Department. "Brent Eager was our half teacher. Sharing him was more to pacify the Business Department for losing control of statistics!" Nielson says.

The first statistics class graduated five students in 1964. Despite those small numbers, Nielson had already instituted a graduate program in 1963, the same year he vacated the post of Department Chair. He continued teaching until 1982, when he was elected to his first of four terms in Congress.

Dr. H. Dennis Tolley was one of the early students in the new department, following on the heels of his father, who took statistics classes as a non-conventional student in the sixties. "My dad graduated from BYU the same week I left on my mission," Dr. Tolley says. "In fact, three generations of my family, including my son, have taken statistics at BYU, and they all had the first name of Howard." Today, Howard Dennis Tolley, the Tolley in the middle, teaches statistics at BYU.

As undergraduates, Tolley and current department chair, Dr. Dell Scott dealt with problems foreign to today's students. For example, rather than use computers to analyze their data, they often took reams of paper and weeks of calculator time to solve statistical problems. In fact, because it took so much time to solve some equations, there would occasionally be problems on exams that had no mathematical solution. "We would be working through, and working through until we realized 'Wait a minute! This one is unsolvable!'" Tolley laughs.

And then there was the noise. "We used roomfuls of mechanical calculators in the old days. The lab was deafening," Tolley continues. "Once, a visitor for Summer Seminar discovered that if you took 1 and divided it by 6666, the calculator generated a sound much like the bass part of a popular boogie."

Because of statistics' deep roots in agriculture, many of the early analyses professors conducted dealt with crop yields and animal husbandry. However, it was a short leap to other fields. In fact, over the years, statisticians at BYU have been quantifying and analyzing virtually everything from athletics to Zion. For example, Dr. William Christensen has studied pre-election polls that purported to predict the outcome of presidential elections. Dr. Scott Grimshaw



The Department of Statistics currently has 18 full-time and 3 part-time faculty, including, Left Die (Clockwise from the top): current Department Chair, Dell Scott, Scott Grimshaw, and H. Dennis Tolley; Middle Die: Natalie Blades, Gilbert Fellingham, and Shane Reese; and Right Die: Lynne Nielson, Dennis Eggett, and William Christensen.

analyzed bias in telephone surveys conducted by NBC. Dr. Natalie Blades studies encompass genome estimates and pancreatic cancer. Drs. Gilbert Fellingham and Shane Reese have worked their statistical magic to improve the performance of both the U.S. Olympic volleyball team and the Philadelphia Eagles. Graduates have gone on to monitor pollution, teach at major universities, and work on defense systems. "We've even done word print studies on The Book of Mormon to analyze the underlying differences of the different writers," Scott says.

THE SEXY JOB IN THE NEXT 10 YEARS WILL BE STATISTICIANS —HAL VARIAN, GOOGLE'S CHIEF ECONOMIST

Fifty years ago, Ernest L. Wilkinson rolled the "cubicle number generating devices" when he asked Howard Nielson to come to Provo. Today it's obvious that he rolled 6's. Maybe he knew the end from the beginning. As Dr. Scott says the study of statistics flourishes today at BYU because "virtually everything can be quantified." Maybe even the probability of success of an inspired hunch. ■

The data suggests that about one-half of the students who earn their BS from the College of Physical and Mathematical Sciences don't go on to graduate school, and many who do earn their graduate degrees don't remain in academia. In fact, according to Dr. Ed Gholdston, chair of the Professional Development Subcommittee of the College Volun-

college volunteer leadership council

teer Leadership Council or CVLC, almost 75 percent of the College's students establish careers in government or industry. "Only about 25 percent go into academia, doing post-graduate research or teaching," he reports.

Gholdston (see "Friends of the College"), who has spent his entire career working on industrial and government development programs, hopes to help the remaining students better prepare for the transition from University Avenue to Wall Street, Main Street, or Capitol Hill. "Our subcommittee focuses on things to help students get ready for a non-academic environment," he explains. "The job market these days is tight, so any plus we can give them, any extra guidance that will help them in applying for jobs and advancing in their careers, is to their advantage and, ultimately, to the school's." To do that, the CVLC is promoting three initiatives.

The committee's Professional Mentoring initiative is designed to put students in contact with professionals in a position to offer internships or jobs, or who are simply willing to offer advice and answer questions. Thus budding scientists, mathematicians, and statisticians can get a real-world view on how they'll be able to use their college education in the private and public sectors. "It's a win-win situation," says Dean Scott Sommerfeldt. "Students can learn things that can help them navigate the business world, and mentors have a way to give back to the college that may cost them some time but little or no money."

To further prepare students to navigate professional waters, the CVLC has also proposed the development of a Business Seminar, a joint effort of the Marriott School and the College. Beginning with the Winter 2010 semester, interested graduates and undergraduates can enroll in the seminar to learn more about accounting, budgeting, project management, product liability, and presentation skills, among other things, many of them taught by Marriott School faculty. "I've been a pretty vocal advocate for increasing the course content in business," says Clark Turner, a member of the CVLC (see "Featured Alumni"). "Science graduates really ought to take a business class, so they understand how businesses run and how they can best contribute."

Of course, in order for all of this to work, students have to stay in school, so the CVLC is working on that front as well. Committee members have always been generous with their time and financial resources, but recently they took on a new commitment, promising a 5:1 match for student donations in the annual spring Choose to Give campaign. This year, both the students and the CVLC came through with enough money to fund a scholarship for each of the College's seven departments. "We told the students that by donating, you are in some sense giving to yourself, but in the process, developing a sense that giving is good," Dean Sommerfeldt says. It's a sense that the CVLC has—in spades. A sense worth emulating. ■

1 Professional Mentoring
initiative designed to put students in contact with professionals in a position to offer internships or jobs, or who are simply willing to offer advice and answer questions.

2 Business Seminar
a joint effort of the Marriott School and the College.

3 Donation Matching
a new commitment, promising a 5:1 match for student donations in the annual spring Choose to Give campaign.

REALLY SOMETHING

bigger than yourself

Hylie Thorpe Barton moved to Ft. Mojave, Arizona, so her husband could practice pediatrics in an underserved area. She ended up helping an underserved population as well. Apparently, parents with special needs children move there, seeking support from grandparents who retire to the area. "I started out trying to improve access to care for special needs children," she explains. "That's expanded to going into schools to help parents get what they need from the schools."

Barton, who triple majored in math, math education, and English and earned her MS in Math at BYU, works out of her husband's office, doing everything she can to meet the educational and medical needs of special needs children and less fortunate parents. A "certified parent advocate," she helps parents develop education plans for their children, advises them of their rights, and works to insure that schools are in compliance. She also

veterinary, forensic, and industrial verification markets. "Now, instead of three or four wall-mounted systems, dentists can carry this device from room to room," he says.

Turner's x-ray devices owe their existence to a fortunate synchronicity. He was working at MOXTEK doing x-ray component design when his dentist mentioned he was going to Russia for humanitarian work and wondered where he could get a portable, bat-

tered with a BS in Engineering Geology from BYU and an MS and PhD in hydrogeology from the University of Wisconsin—moved to Senator Pete Domenici's office to continue work on water problems. In November 2007, he became the manager of the Institutional Relations Department of Albuquerque-based Sandia National Laboratories, a lab he calls his home institution. "I started at Sandia as a researcher in advanced techniques for cleaning up ground water," he explains. "When I returned in 2007, they looked at me not as a water expert, but as someone who could advise them how to communicate effectively with Congress on key policy issues."

Sandia still lets him do water, however. In fact, in July, he was on Capitol Hill in



Hylie Barton ('94 BS, '95 MS) with Heather at Barton's medical home that serves the medical needs of special needs children and less fortunate parents. Five-year-old Heather has cerebral palsy with hydrocephalus and dwarfism.



Clark Turner ('85 BS and '91 PhD) is founder and CEO of Aribex, a company that manufactures a family of handheld, battery-powered x-ray devices for dental, veterinary, forensic, and industrial verification markets.



Erik Webb ('86 BS) with Senator Pete Domenici (left). An expert on water, Webb is both the manager of Sandia Laboratories' Institutional Relations Department and an ardent advocate of the need to address the nation's water problems.

offers prenatal classes to expectant mothers, among other things. Finally, she established a medical home, a center to coordinate the special healthcare needs of children. "So there's one place where the doctor can learn what all the different specialists are doing with a particular child," she explains.

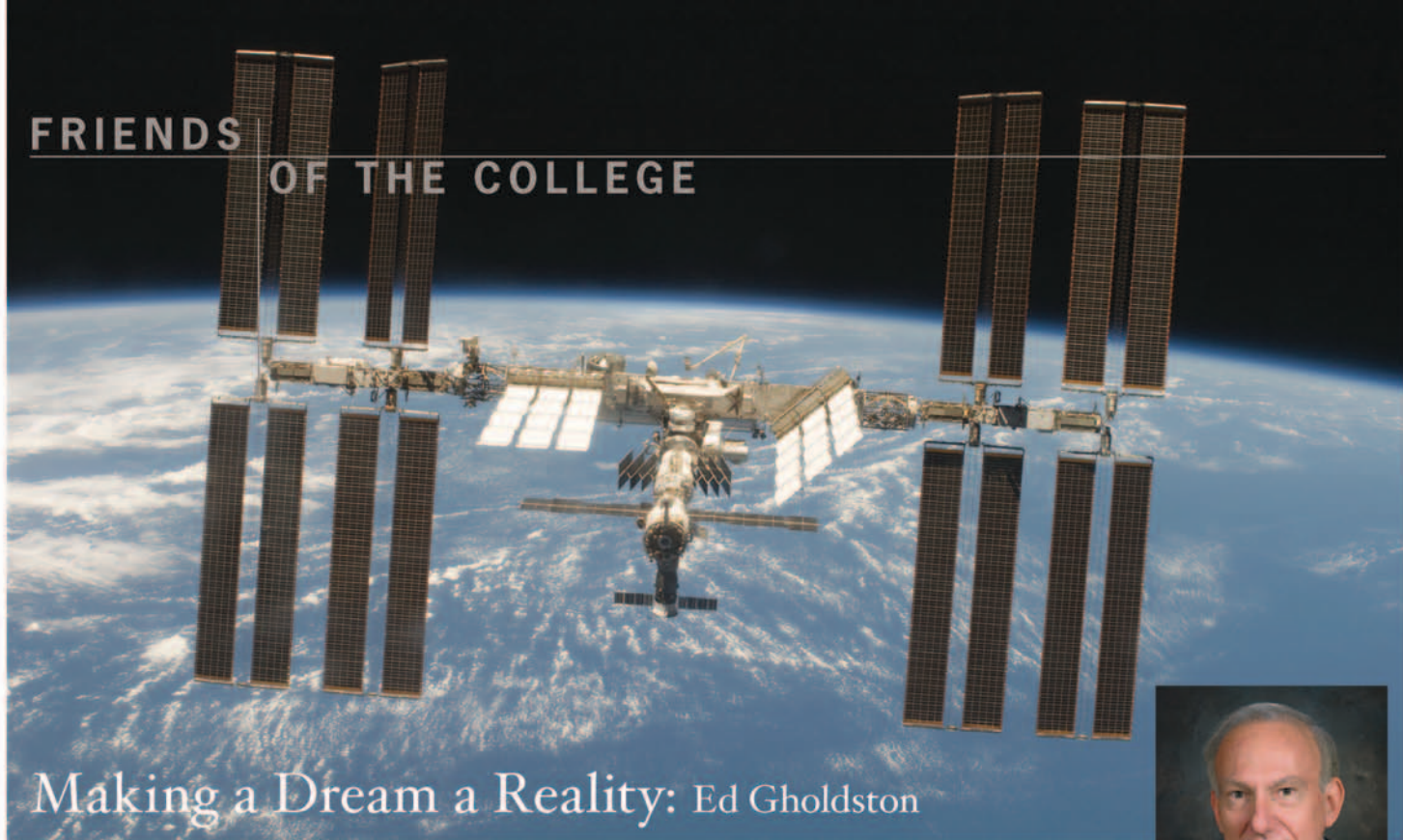
Like Barton, **Clark Turner** fills a niche. Turner, who earned his BS and PhD in analytical chemistry at BYU, is founder and CEO of Aribex, an Orem-based company that manufactures a family of handheld, battery-powered x-ray devices for the dental,

tery-powered x-ray device. Turner realized he could adapt what he was working on to his dentist's needs. "Medical devices weren't within the scope of MOXTEK's business, so my dentist and I pooled our money and built a prototype," Turner explains. Today Aribex employs 30 people and supports dozens of humanitarian missions each year by donating x-ray devices two weeks at a time.

Erik Webb was a Congressional Fellow on the Senate Energy and Natural Resources Committee when Turner started Aribex. From there, Webb—an expert on water is-

Washington D.C. to speak at the National Water Policy Event and to attend a screening of the movie *Are We Running Dry: An American Southwest* for which he received an executive producer credit. He then went to Baltimore to speak to the Lieutenant Governor's Association on water issues. "It's enormously challenging and rewarding to do both the science and the policy as they concern the country's water problems," he says. Just another day tackling problems bigger than himself. ■

FRIENDS OF THE COLLEGE



Making a Dream a Reality: Ed Gholdston

Ed Gholdston was born and raised in Orlando, Florida, some 30 miles from Cape Canaveral and the John F. Kennedy Space Center. He was just 14 years old when Alan Shepard became the first American to fly into space as part of Project Mercury. It was the first launch he watched. It would not be his last. "We would stand on the lawn and watch them," he says.

Today, as the Hamilton Sundstrand deputy program manager for the Crew Exploration Vehicle (CEV or "Orion"), part of the new modular launch vehicle approach that NASA is taking to return to the Moon and later take us to Mars, Gholdston has a front row seat at the launches. And whereas before he could claim to have attended the same elementary school as astronaut (and Moon walker) John Young, he is now on a first name basis with many of them. "We get their feedback on stuff that we've built or designed for them," he says. "It's very rewarding, and in many ways it's a lot of fun."

That pretty much describes how Gholdston feels about his work. Whether it's as a deputy program manager at NASA or as chair of the Professional Development Committee of the College Volunteer Leadership Council, he loves what he does. Though he earned his BS in Physics at Florida State—where he also joined the Church—he did his graduate work at BYU, working on the Topotron plasma confinement experiment with Drs. Nelson, Gardner, and Rasband. As he describes it, the project provided outstanding involvement with a strong mix of professors

and students working on a large-scale experiment, backed by innovative theoretical work. "The guidance my professors provided on the project was invaluable in learning how to conduct a long-term research or technology development project," he explains.

That experience helped him better carry out his duties in his first job at Texas Instruments as a member of a group doing research on the use of piezoelectric crystals in processing signals at microwave frequencies.



The Orion Crew Exploration Vehicle will carry four to six astronauts. Combined with the so-called Service Module, it will replace the space shuttle.

It helps him now as he manages a very large project that is part of an even larger NASA program. "The program is truly international and involves key partners in Europe, Russia,

and Japan," he says. A former missionary to Germany, he welcomes the opportunity to practice his German when he works with the European Space Agency.

As chair of the Professional Development Committee, he hopes to provide students with similar advantages when they enter the workforce. According to Gholdston, almost 75 percent of the students who graduate from the College of Physical and Mathematical Sciences go on to work in a non-academic environment. He sees his job on the CVLC as preparing students to succeed in that environment. "The future of BYU's graduates is very much intertwined with their ability to function out in the field," he says. "Any advantage we can provide them will help them do that."

Ed and his wife Merleen (an engineer with the bio-tech firm Amgen) are the parents of three children, including a daughter who graduated from BYU, a daughter currently attending BYU, and a son currently deployed to Iraq as a Navy Seal. "I had such a priceless experience here," he says. "I really love the school and the spirit that is here, so I'm all for anything I can do to help the school achieve its mission." ■

The Award for Being Unbelievably Organized Goes To ...

Gypzy LindH, manager of the Chemistry Central Stockroom, received the award for Outstanding Service at the meeting of the National Association of Scientific Materials Managers (NAOSMM) in San Antonio. NAOSMM is an association of university and industry science storeroom managers from across the U.S. and Canada. This is the first time in its 25-year history that the association presented the award. LindH was one of three to receive the honor. The award recognized her outstanding skill in managing a complex stockroom operation and acknowledged her service as program co-chair three years ago and as program chair for the past two years.

LindH will present this year on "Science Stockroom Organization" at the conference in Boise, Idaho. In addition, she will be the NAOSMM Trade Show coordinator for the conference as well as in Norfolk, Virginia, next year. In spite of the current economic crunch, she improved the number of companies represented at the show by 40 percent. ■

And the Award for Student-Produced Animated Movies Goes To ...

Pajama Gladiator and *Kites*, two student-produced animated films in which students from the Department of Computer Science were heavily involved, have won prestigious awards at the 36th Student Academy Awards sponsored by the Academy of Motion Picture Arts and Sciences. The Academy awarded *Pajama Gladiator* the Gold and *Kites* the Bronze Medals in the Animation category. Both films won Student Emmy Awards earlier in the year. Many students who have worked on BYU animations have gone on to Pixar and other major studios. Apparently, they've made an impression. Ed Catmull, the president of Pixar, says that BYU students are "the best in the industry." ■



Kites (top) and *Pajama Gladiator* (bottom) recently won Student Academy and Student Emmy Awards.



Computer-Controlled Telescope Allows Students to Sleep on the Job

In a far-off galaxy, the core of a high-mass star collapses and emits a powerful gamma-ray burst. In the Utah desert, BYU's newly operational Remote Observatory for Variable Object Research (ROVOR) watches the event. The next morning, BYU astronomy students analyze the data from the comfort of campus and after a good night's sleep because ROVOR, a computer-controlled telescope located west of Delta, Utah, takes instructions through a remote satellite link between campus computers and two on-site computers, using remote desktop software. That link allows students to remotely open the observatory's roof and verify that all systems are working. "During the night a computer moves the telescope around the sky, changes filters, takes images and stores them on a hard disk," says Professor J. Ward Moody of the Department of Physics & Astronomy.



Professor J. Ward Moody and one of his students observed a gamma-ray burst, using ROVOR.

Recently, Moody and ROVOR team member Richard Pearson observed a gamma-ray burst less than a day old. Such bursts are among the most luminous electromagnetic events in the universe. ROVOR allowed Moody and Pearson to measure the intensity of the optical counterpart of the burst. Their results were reported to the NASA Gamma-ray bursts Coordinates Network or GCN. ■

Professors Say Utah Rocks

The third edition of *Geologic History of Utah*, by emeritus professor of geology Lehi F. Hintze and geology professor and newly appointed associate dean Bart J. Kowallis, has recently been published. For visitors and residents of Utah, the book serves as a field guide to Utah's rocks, a guide accessible to both tourist and geologist.



Professor Bart J. Kowallis' (left) and emeritus professor Lehi F. Hintze's book *A Geologic History of Utah*, has sold more than 25,000 copies.

The book divides Utah into 116 regions, detailing the types of rocks found in each region and giving the time period in which the rocks originated. In fact, *Geologic History* dates some Utah rocks to the Archean Period, roughly 2.5 billion years ago. While the red rocks of Southern Utah are the state's most famous geologic wonder, the book demonstrates that even the area surrounding Salt Lake City provides a choice experience for the informed observer. Since its publication in 1972, *Geologic History of Utah* has sold more than 25,000 copies. ■

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WHY THIS MATH WHIZ HAS A HARD TIME COUNTING HIS BLESSINGS

Pedro Acosta is infinitely grateful for BYU Annual Fund donations. During his undergraduate years, the physics and mathematics double major has received mentored learning grants allowing him to work with professors on research dealing with algebraic geometry and string theory. From these experiences he has written scholarly articles and developed an understanding that goes far beyond the standard curriculum.

Pedro says, "Without my mentorships it would have been impossible for me to have the same kind of educational experience."

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