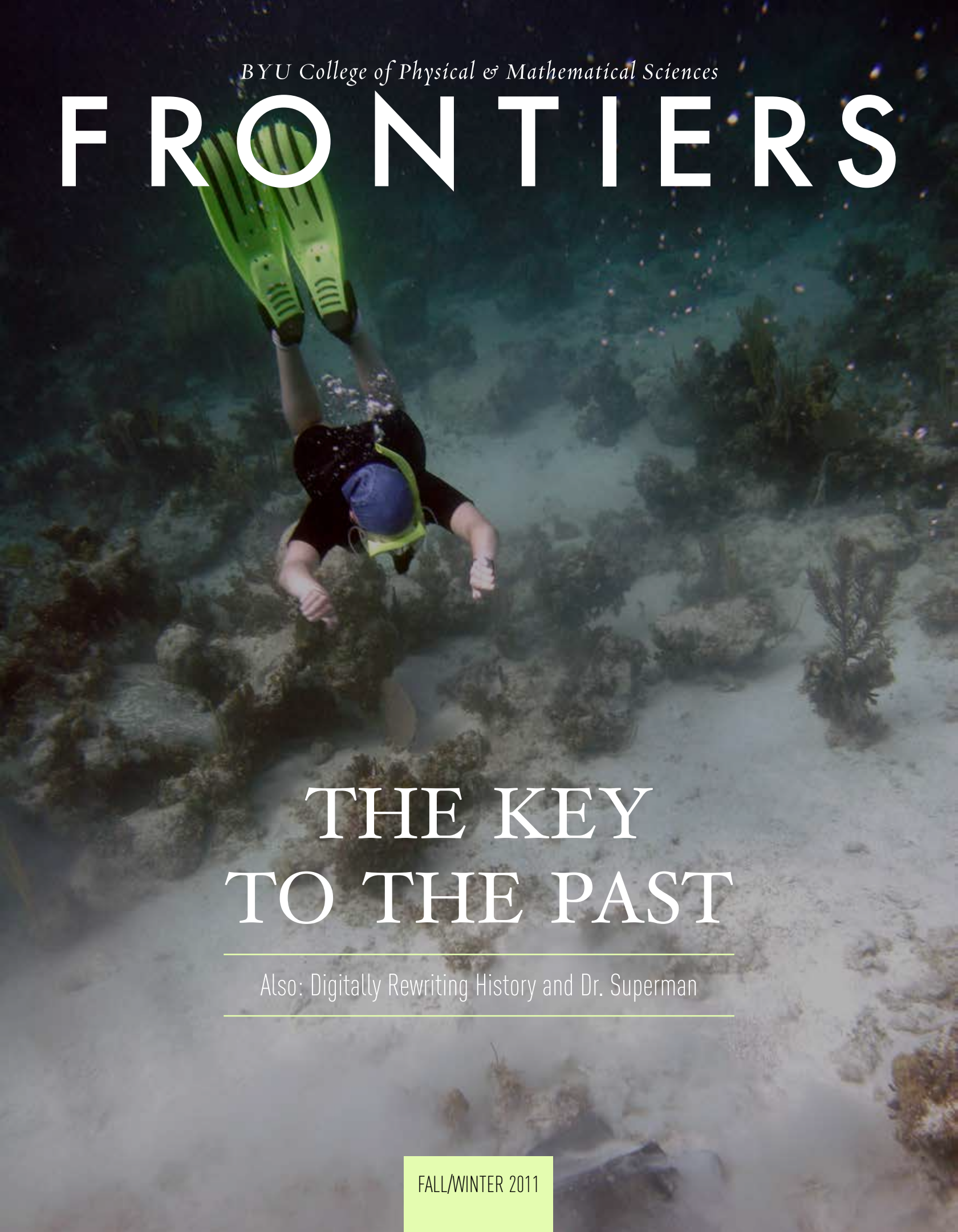
BYU College of Physical & Mathematical Sciences

FRONTIERS



THE KEY TO THE PAST

Also: Digitally Rewriting History and Dr. Superman

FALL/WINTER 2011

dean's message

It seems that everyone's mailbox has been flooded with ads. Scores of companies selling new backpacks, sneakers, and pencil boxes remind us that the fall season is upon us. While students may want to escape the back-to-school fever, we embrace it. As fall semester gets underway, we open our doors to students and stand ready and excited to begin educating both new and advanced students.

The faculty here in the college certainly stand out as excellent educators. Semester after semester, they prove themselves to be dedicated, energetic, and skilled. In addition to being competent in their disciplines, they do a wonderful job of communicating that knowledge in an accessible and beneficial way.

Most importantly, our faculty members are very interested in student learning. Unfortunately, at some universities teaching is relegated to secondary status in favor of a strong primary emphasis on research. But in CPMS we emphasize teaching and research, and seek for balance between both of these important activities. Our professors are focused on providing an outstanding learning experience for our students—both in the classroom and in the lab.

We see among the faculty a widespread recognition that some of their greatest work is done in helping students grow into capable scientists and educators. Faculty members in the college are genuinely approachable, even as they handle large classes and a heavy workload.

In this issue of Frontiers, you'll get a closer look at how our faculty are improving the lives of their students as they mentor them in the lab, the classroom, and the field.

Dr. William Barrett's work in handwriting recognition is not only changing how genealogy is done; in his lab after class, students are applying their knowledge of computer science in novel ways everyday (p. 1).

In the classroom of Dr. Harold Stokes, Harold's love for his students, science, and teaching may drive him to daring acts, but he's determined to bring science to life, however painful that might be (p. 3).

With help from caring professors, both past and present, geology students spent a week diving into the Bahamas in search of more than buried treasure and surfaced at the end of a one-of-a-kind experience with new knowledge and understanding (p. 5).

Since our last issue, CPMS students, faculty, and alumni have received recognition from all over the world. You'll find more about their achievements on pages 7-13. In our college news section, you can get a taste of the many fun events that went on this summer and begin planning your schedule to join in for some of next year's events (p. 9-10).

As this new school year unfolds, we expect to see many more accomplishments and events, and we look forward to sharing them with you in our next issue. Thanks to the support of the many friends of the college, like yourself, as well as the outstanding efforts of our faculty, we will continue to bring the best to our students.

In the next few months, we will be launching an initiative to raise two endowments that will help us meet the critical needs of our students. These two endowments will provide further support for continued mentored learning opportunities for both undergrad and grad students. Watch for more information to come on how you can support the same great research and teaching that you'll find in this issue.

Wishing you all the best,

Scott Sommerfeldt

Scott Sommerfeldt, Dean

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DIGITALLY REWRITING HISTORY

—*Erik Westesen*

It's hard enough to read your own handwriting sometimes—much less something written 100 years ago by someone you don't know. Genealogists know that mistaking an inky *17* for a *19* can make a huge difference. Over the past few decades, the world has seen great technological advancements in genealogy, but is there technology that can turn the most undecipherable scratches of ink into accurate data? It might happen sooner than you think.

After twenty years of research, Dr. William Barrett—of the BYU Computer Science Department—has advanced the ability of computers to read and interpret handwriting. Working with fellow computer science professor Dr. Thomas Sederberg and PhD candidate Doug Kennard, Barrett has developed new methods that can dramatically decrease the time it takes to decipher handwritten documents, providing genealogists and historians the world over with access to valuable information at the push of a button.

In the early 1990s, Barrett began researching the use of technology in family history when the LDS Church decided to start creating digital images of all its microfilm records. Barrett scanned and digitally enhanced a few of the Church's microfilms and found that the Family History Department was excited about the potential of digital imaging. That was when Barrett set a personal goal to advance this technology to the point that computers could read the written records.

"[Developing this software] is kind of the job I've assigned to myself. . . . You have to do it because you made a promise to yourself," Barrett said. His system seeks to partially automate the current method of transcribing the hundreds of thousands of microfilm records that the Church has already scanned. Right now, the Church has volunteers worldwide who look at scanned images and transcribe the data they contain into an online form. Every record is transcribed twice: one time each by two separate volunteers, indexer A and indexer B. If the transcriptions disagree, the record goes to an arbitrator, a third volunteer who decides between the two transcriptions. After arbitration, the records are then compiled and made available on the Internet in a searchable database.

Software that can read machine printed text already exists, but the technology to read handwritten text is not yet accurate enough to have much practical use. If automated handwriting recognition software were accurate enough to be used as the second indexer, the church could potentially double its volunteer power; only one volunteer and an arbitrator would be needed.

"We're leveraging the human intelligence and vision; we're not necessarily replacing [it]. We want to keep [people] from having to do the tedious stuff. That's what computers are good at," Barrett said.

The process itself is more complicated than just feeding microfilm into a computer. Before he could work on the handwriting recognition software, Barrett had to figure out several other complicated problems. Many microfilm records are difficult to read because the records were old or damaged when they were originally photographed. Barrett's first challenge in working with these images was developing algorithms that automatically crop, align, enhance and zone the

> "You have to do it because you made a promise to yourself."

images to make them easier to read and transcribe. Another problem to tackle is that each page might have both written and printed words, some horizontal and some vertical. Although the technology to read printed text already works well, Barrett still had to devise algorithms that would allow computers to recognize the difference between machine print and handwriting, and vertical and horizontal print.

After several years of hard work and dedication from BYU students and FamilySearch engineers, the scanning process is now fully automated.

"BYU students were actually part of the team that helped develop the scanning technology so that you could push a button, the microfilm would roll through, and [the computer would] scan it, crop it, and store it," Barrett said.

> "We're leveraging the human intelligence and vision; we're not necessarily replacing [it]. We want to keep [people] from having to do the tedious stuff. That's what computers are good at."

With the scanning process operational, Barrett can now focus on writing algorithms that can train computers to more accurately recognize handwriting. One of the more successful methods of computer handwriting recognition, initially developed at the University of Massachusetts Amherst, stretches images of handwritten characters horizontally so that they fit better to what the computer recognizes as a letter or number. Using this method, 70-80 percent of the time the computer accurately transcribes the correct handwritten word if they are words that the computer is already familiar with.

Dr. William Barrett is committed to putting computers to good use. As he works to fulfill his own personal mission, he's also giving BYU students lots of work to do as research assistants. Photo by Levi Price.

Barrett and Kennard decided to push the method further using algorithms to stretch the characters both vertically and horizontally. This method increased accuracy to 81-87 percent. They then applied morphing technology (developed at BYU by Sederberg) to the words. The less morphing required to make a written word match the computer's vocabulary, the more likely it is that the computer is reading the word correctly. By applying both morphing and stretching technologies, they have now reached an unprecedented 89 percent transcription accuracy on words that the computer is familiar with.

With a challenging problem like handwriting recognition, Barrett said improvement beyond 80 percent is usually incremental at best. With the application of new ideas at BYU, accuracy has improved by nearly 10 percent, or what Barrett describes as a quantum jump in improvement.

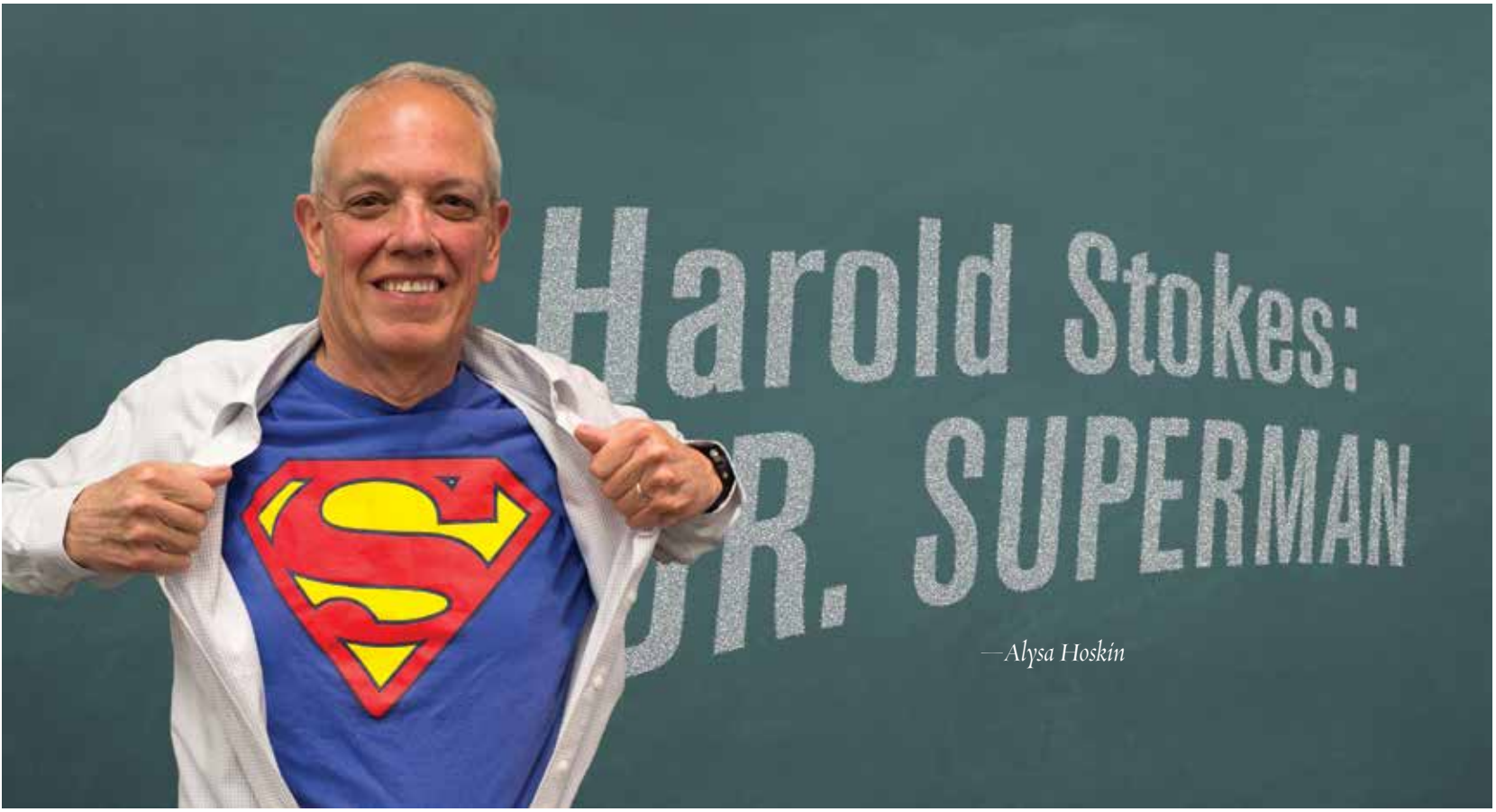
"Now that's really exciting because, well, we haven't even pulled all our tricks out of our sleeve yet," Barrett said.

The next challenge is teaching the computers to recognize the difference between words with similar letter combinations, like "you" and "your," or "the" and "there." Barrett said they are working on a confusion matrix, a list of words that are often confused with one another. When the computer comes across a word in that list, it will double-check it.

After that, they will also teach the computer to use contextual information about the records to help it determine what words are more likely to be used. If the computer knows a record is from Central America instead of Western Europe, it will know what kinds of names to look for. Other contextual elements include language, date, and other fields on the form, like gender, age, or occupation.

By teaching computers to use context and read accurately, Barrett said he hopes to push accuracy into the nineties. Then this method could be used for indexing census records, journals, and other important books and records. Barrett, Kennard, and Sederberg have submitted their work to be presented at an international conference in China where Barrett will also be co-chairing a workshop on historical documents.

"There is much more to do beyond handwriting recognition, as fun and compelling and challenging a problem as that is," Barrett said. "We're really trying to build the technology that allows people to work together and work efficiently." ¤



Harold Stokes: DR. SUPERMAN

—*Alysa Hoskin*

Most people don't wear a Superman logo to work under their shirt and tie. Most people also don't shoot themselves with a Ping-Pong ball going over 500 miles per hour. Apparently BYU physics professor Harold Stokes is not like most people.

To demonstrate the force of atmospheric pressure in his physics classes, Dr. Stokes shoots a Ping-Pong ball through a vacuum cannon. The cannon is fired first at the wall, then at a piece of 1/8-inch plywood (which it easily breaks through), and then at his stomach.

Bravely wearing an apron with a large target, Professor Stokes stands in front of the cannon without any artificial protection, except what he calls his "natural padding."

At the end of the demonstration, Stokes admits he does have one secret protection, and then opens his dress shirt to show a bright blue Superman T-shirt underneath.

Despite his steely response to the impact, he confesses to his class, "Actually, that really hurt." He then reveals a large, red welt on his stomach. While a Ping-Pong ball is lightweight, once it gets going at 70% of the speed of sound, it's bound to make an impression. However, Dr. Stokes is less worried about the pain and more interested in the impact it makes on his students.

"I always try to put twists in the demonstrations like that," Dr. Stokes said. "I add little, unexpected things if possible and relate it to physics."

Born for Physics

Harold Stokes considers himself a natural physicist. In high school he knew he wanted to be a physicist, and he never changed his mind. From Long Beach, Calif., Stokes came to BYU as an undergraduate and loved every minute of it.

When he needed to use computer calculations in his undergraduate research, he bought a book and taught himself how to program computers. This self-training has been instrumental to Stokes' career as a computational physicist.

After completing his Ph.D. at the University of Utah, where he met his wife, Stokes completed his postdoctoral program at the University of Illinois before being hired as a professor at Brigham Young University.

"I have never regretted the decision to work here at BYU," he said, "I have had a wonderful 30 years getting paid to do something that I love so much."

The Man Behind the Clicker

A sign hanging in his office serves as Stokes's personal career motto. It reads, "Choose a job you love, and you will never have to work a day in your life."

One way his love of career is manifest is in his efforts to improve teaching through various technological innovations. He was the first professor on campus to use clickers, electronic remotes that allow professors to instantly quiz students and record their scores digitally.

Several years ago, Dr. Stokes worked with the Information Technology to set up this technology. Originally using infrared clickers, BYU classes now employ clickers with Radio Frequency, which requires much less

infrastructure. These are now used throughout campus giving all students a voice, regardless of the class size. This has altered classroom structure by increasing interaction, all because of Dr. Stokes' persistence and foresight.

Additionally, Professor Stokes implemented a system for privately posting scores and grades online. He also uses a PC tablet, a touch screen device that combines handwriting and slides, in the classroom instead of using classic overhead transparencies or Power Point slides.

When he attends national physics teacher conventions, Professor Stokes is always looking for new technology to bring back to Provo. Recently, he found something else that may be implemented in the future: a device that allows a portable tablet to project on classroom walls via WiFi.

Living with Prosopagnosia

"When I was younger, I didn't know what was wrong," said Dr. Stokes. "I didn't know why I wasn't recognizing people. I didn't know it was a real disability that I had."

Dr. Stokes deals with a disorder called prosopagnosia, which impairs his ability to recognize faces. "It takes me all semester to learn 15 faces," he said. "And sometimes, I still can't recognize them by the end of the semester."

Though this disorder has led to some embarrassing situations, Professor Stokes said that he has basically learned to live with it. "I'm a physicist, and we tend to not let social situations get us too embarrassed. We generally lack social skills already. So, in some ways it fits in with my profession."

"I always try to put twists in the demonstrations like that," Dr. Stokes said. "I add little, unexpected things if possible and relate it to physics."

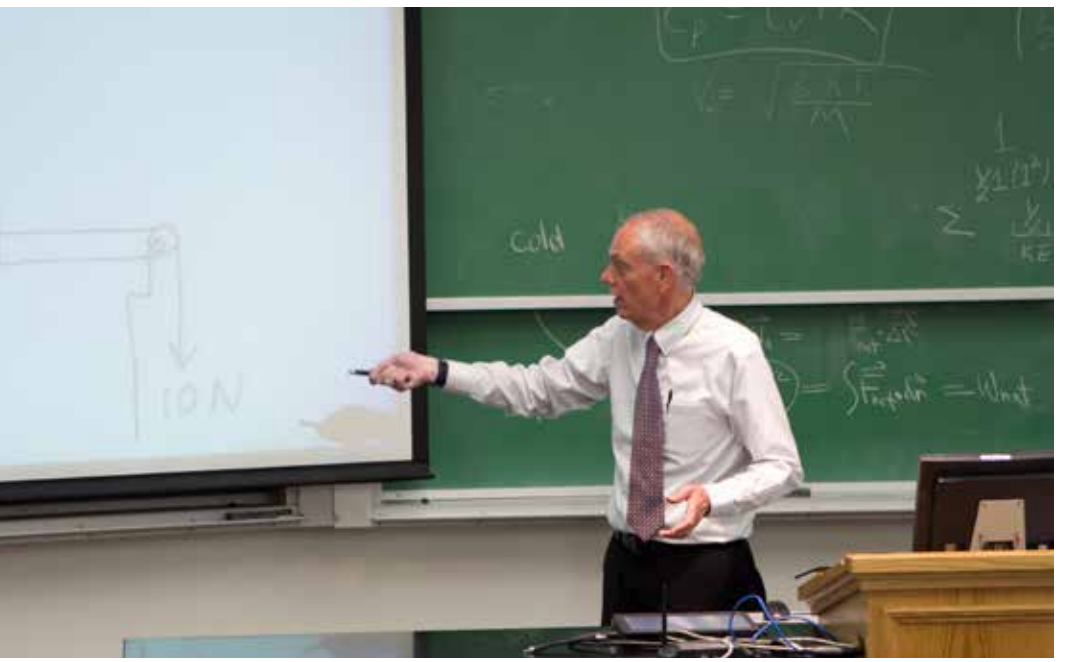
The Future of Dr. Superman

Many ask Stokes if he will ever complete the Ping-Pong cannon experiment again.

"My wife hated it whenever I shot myself," he said. "Last winter I taught two sections of Physics 105, and I decided that I didn't want to shoot myself twice in the same day. That gave me reason to videotape the demonstration."

Now that he can use the video to complete the demonstration, Professor Stokes does not plan on shooting himself again anytime soon. "I've lost a lot of weight since then," he said. "I'm afraid I don't have enough natural padding now." ¤

Left and Below: *Dr. Harold Stokes lectures on campus. Photos by Levi Price.*



Clickers on Campus

Over the years, Dr. Stokes has implemented many technological innovations in the classroom, including electronic clickers. This response system is one that has greatly impacted campus.

"I use clickers to review material from the last lecture at the start of class. That way the students need to be in class on time, and it forms a natural segue into the day's lecture."

-Dr. J. Ward Moody

"I use them to encourage students to come to class on time, to track student understanding, and sometimes, to create a Socratic dialogue with students to emphasize a linear development of a concept."

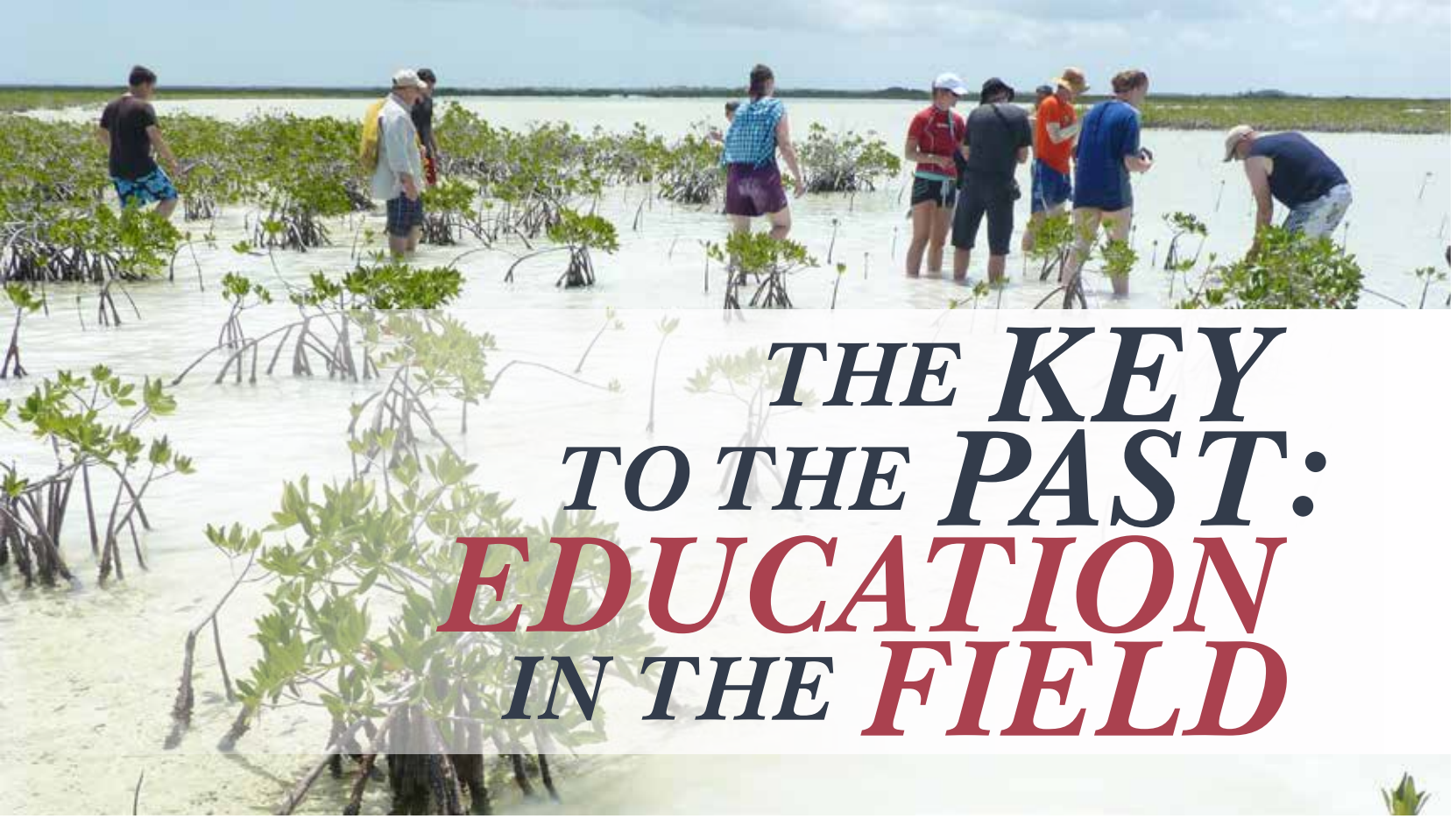
-Dr. Juliana Boerio-Goates

"Clickers provide engagement. I had two classes last semester. One used clickers; the other used another way for the students to show their response. It seemed to me that more were involved in the course that used the clickers."

-Dr. David Allred

"I use them as a way to encourage students to prepare for class. I also use them as a diagnostic to see if students understand the ideas that I am teaching. Often it helps me see where I need to spend more time, but it also helps me see when students already understand, and I can move on."

-Dr. Matthew Asplund



THE KEY TO THE PAST: EDUCATION IN THE FIELD

By Katie Pitts

When it comes to rocks and fossils, geologists are more than familiar with the principle of uniformitarianism—the present is the key to the past. But for students who attended the Hamblin Global Geology Field Trip to the Bahamas, these geological features of the present and the past are the keys to their futures.

Building the Foundation

During his life, W. Kenneth Hamblin (1928-2009) was many things: husband, father, football star, author, world traveller, dedicated teacher, and a geologist.[1] It was his passion for hands-on geology that led him to establish the W. K. Hamblin Global Geology Field Trip Fund following his retirement from BYU's Department of Geological Sciences in 1993.

Thanks to this subsidy, 29 students travelled to the Florida Keys and the Bahamas between April 23-30, 2011 to take part in this year's field trip. Prior to stepping on the plane, students spent winter semester attending monthly lectures and preparing background information on the locations that they would soon be diving into.

Only in the Bahamas

If you drive about twenty minutes southeast of Provo, up Spanish Fork Canyon, you'll see an outcrop of ancient limestone that dates back to the Jurassic period. But if you want to see what Spanish Fork Canyon looked like when this limestone was being deposited, there are two options: time travel back over 165 million years ago, or visit a modern site where the same kind of limestone is being deposited right now. If you're thinking option two sounds good, head for Florida and the Bahamas.

"Not that we don't have great geology in Utah," Dr. Scott Ritter, chair of the Department of Geological Sciences, is quick to point out. "There are just certain things that you can't see here at the present time."

Going to the Florida Keys and the Bahamas allows students to see geological processes in action. As the water conditions change, plant and animal life changes, and so does the sediment. Seeing these transformations actually happen across the ecological spectrum from the Everglades to the outer shelf reefs is a great educational opportunity.

"[This area] is really only one of three places in the world today where tropical carbonates are being formed," said Ritter. "Fifty percent of the world's oil and gas comes out of carbonate rocks [including limestone]. [They're] really just made up of pieces of plants and animals; carbonates are born not made."

"This trip truly was a life-changing experience, and every moment was one I hope not to forget."

On the trip, students travel to locations like the Windley Key Quarry, where they can see outcrops of limestone that formed 125,000 years ago. Later in the day, they have the chance to snorkel five miles offshore and see limestone forming through the same process. Getting to see modern patterns freeze into rock is an experience that cannot be replaced or simulated.

In, But Not Of, The Classroom

Snorkeling everyday, viewing breathtaking scenery, and enjoying warm ocean waves: the Bahamas is a great destination. Still, students who participated in this year's trip found far more than a chance to get out of Provo.

For Stephen Phillips, a graduate student studying sedimentology and stratigraphy, this field trip was an unbeatable way to bring his education in carbonate rocks together.

"To go out in the field and actually see the rocks that we'd been looking at [in our classes] . . . is amazing. Now I can actually picture sitting in the mud that's being formed," he said. "Everything just all of a sudden made sense. You think you kind of understand things, but when you finally see it, you understand it for real."

Ritter says that once students literally get immersed in marine geology, they begin having "ah-ha" moments of understanding, which connect their classroom experiences to the real world.

"[The difference] is like reading about a volcanic eruption and then standing [and] watching one," he said. "You don't understand the scale or the process or how everything interacts until you're up there pounding back and forth with the waves."

For Kevin Fukui, a senior studying geology from Elwood, Utah, the boat trip to Joulters Cay, small islands in the Bahamas, left a lasting impression.

"The beautiful turquoise water and brilliant white ooid shoal beaches were not only breathtaking to look at, but created an understanding of how carbonate rocks form that cannot be duplicated in the classroom," Fukui said in an email. "When I look at ooids [small sedimentary grains] in rocks, I no longer remember diagrams and explanations found in my textbook, but I am taken back to the unforgettable beaches of the Bahamas where I witnessed their creation."

John Hoopes, a graduate student in geology, felt that the trip also provided a unique setting for getting to know fellow geologists.

"One of the most memorable parts of the trip was being able to travel and see geology with faculty and classmates you've known for a few years," Hoopes said in an email. "There is something special about traveling together and having a good learning experience outside of the classroom."

Below: Geology students examine marine rock formations in theBahamas. ***Bottom Left:*** Scott Ritter examines a specimen. Students get a chance to see geological processes, like these sand formations, in action.

"Everything just all of a sudden made sense. You think you kind of understand things, but when you finally see it, you understand it for real."

Moving into the Future

For many of these students, this field trip is just the beginning This year's trip included conducting a ground-penetrating radar survey on the limestone. Professor John McBride, who specializes in this technology, has obtained a mentored research grant to continue the project. This research opportunity will mean a return to the Bahamas in the near future for some of the students.

While others may not be returning, they'll be carrying their fresh knowledge into new realms of exploration as they enter the workforce. Hoopes will be taking what he's learned about carbonate rocks into a career in the oil industry.

"This trip has helped me solidify concepts discussed in the classroom and given me the experience of handling [carbonates] in the real world," he said. "I understand their environments of deposition, why they look, feel, have fabrics and textures the way they do. These are real concepts used in the understanding of paleoenvironments, the creatures and fauna that lived in them, and present oil and gas exploration."

After building on their knowledge that the present is the key to the past, these students are headed for great futures.

"This trip truly was a life-changing experience," said Fukui, "and every moment was one I hope not to forget. I consider myself very lucky to have had such an amazing experience and to be taught and receive support by such a wonderful faculty in the Geology Department." ¤

[1]*Obituary. "William Hamblin," Daily Herald, October 7, 2009, http://www.heraldextra.com.*

Staying Connected Wherever Life Takes You

By Alysa Hoskin

Even though he doesn't live anywhere near Provo, alumnus Gerry Morton finds ways to stay active as a friend of the College of Physical and Mathematical Sciences.

Currently residing in Houston, Texas, where he serves as general counsel and vice president for business development at Carrizo Oil and Gas, Inc., Morton sets aside time to serve as both a member of the College Volunteer Leadership Council (CVLC) and as chair of the Department of Geological Sciences Alumni Board. He fulfills these responsibilities from over 1,400 miles away.

In that capacity he has occasionally conducted meetings over speakerphone, but more commonly he attends in person because he has made service to the college a top priority. Morton decided to become actively involved ten years ago when his children started coming to BYU. He has now sent five children to BYU with one more entering next year.

His volunteer efforts with the Geology Alumni Board and the CVLC center on how to help current students. One of the projects he participated in was the creation of the Department of Geological Sciences' Career Pathways Seminar, a lecture series with alumni speakers, which provides students with valuable information about career opportunities and graduate school.

Morton feels it is important to stay connected to BYU after graduation. "[Graduates] have both a moral, and frankly, a self-interested, obligation to support current students, whether it is financially or through helping students start careers," Morton said. "I think that we are blessed through the service, reputation, and accomplishments of our new graduates, just as we alumni can enhance and bless their lives through our reputation and actions."

After graduating from BYU in 1982 with a bachelor's degree in engineering geology, Morton was hired at Texaco as a geophysicist. While working on an MBA degree at the University of Houston, he took a law class and really enjoyed it. It was then that Morton decided to get his juris doctor at the University of Houston Law Center—an unexpected twist in his journey through life.

Following law school, Morton was employed first by a major New York law firm and later by a natural gas exploration and production company (Pogo Producing) as senior vice president and regional manager for Asia and the Pacific, until he landed his current job where he again has cycled back into the practice of law, among other things.

As a volunteer at BYU, he has taken part in an effort to gather other alumni from the Department of Geological Sciences for networking and outreach in various cities. Morton has also supported other projects at BYU like the creation of Prospect Development: Business Side of Geology, a hands-on class that was created by geology alumni and has been active in helping with fundraising for a 3-D visualization lab. He even convinced his company to make a substantial donation of seismic data to the lab.

In addition to his frequent gifts of time and effort, Morton has also contributed generously to the College's mentorship fund. Contributions such as his make hands-on research opportunities available to many students.

"You never know which direction your career will take," Morton said, "but what's important is that you have a high quality education like BYU offers and broaden your experiences so you are prepared when the opportunity presents itself. Don't get locked into what you think you will do when you graduate or start your career. Be flexible, prepared, and enjoy the journey."

"What's important is that you have a high quality education like BYU offers and broaden your experiences so you are prepared when the opportunity presents itself."

Top Left: Gerry and his wife, Rebekah. **Above:** The Morton family. Photos courtesy of Gerry Morton.

Students Return Victorious, Bringing Home Awards, Scholarships, and Honor

College

In March, students gave back to students in the "Choose to Give" program. Choose to Give is an annual university campaign that invites students to give any amount they can to fund scholarships for other students. Since 2000, C2G has awarded over 34 need-based scholarships. As CPMS students made their way through the donation line, they were met with a tasty, blowtorch-grilled hot dog.

In April, the graduating senior class looked back on their college experiences and looked forward to the rest of their lives. Spring convocation included remarks by Dean Scott Sommerfeldt, as well as graduates Aaron Pulsipher and Marie Killian.

Chemistry & Biochemistry

At the 35th Annual International Symposium on Capillary Chromatography in San Diego, BYU graduate student Dan Li received the prestigious Leslie Ettre Award, a $3,500 grant which is presented to a young scientist with original research in capillary gas chromatography. Three other BYU students were recognized in the top ten at the symposium.

Y Chem—a branch of the American Chemical Society and BYU's chemistry club—received honorable mention for its 2009-2010 accomplishments at a national convention in Anaheim, Calif., in March. The Society was most interested in the club's broad spectrum of activities—from dances to organized sports.

Computer Science

A freshman intrigued with computer science, Christine Kendall was selected for the $2,000 Microsoft scholarship from hundreds of applicants across America. As part of the award, Kendall experienced the Explore Microsoft internship this summer, a hands-on training experience.

Geological Sciences

Terik Daly won a Barry M. Goldwater award, a scholarship for excelling in math, natural science, or engineering. He studies the chemistry of micrometeorite impact with Dr. Daniel Austin, a chemistry professor. This is the fourth consecutive year that a BYU student has claimed the scholarship.

In a quiz competition hosted by the Society of Exploration Geophysicists in Denver, BYU students took home top honors for their superior geology knowledge. As western region champions, Matt Davis, a graduate student from Queen Creek, Ariz., and Forrest Roberts, a senior from Frannie, Wyo., won all-expenses-paid trips to compete against other winning teams from around the world at the society's annual meeting in San Antonio.

Mathematics

BYU students placed 16th in the Putnam Mathematical Competition, the highest the team has been ranked in 21 years. Hiram Golze, Michael Griffin, and Robert (Tianyi) Yang placed sixteenth in the Putnam Mathematical Competition. This is the highest that a BYU team has been ranked in twenty-one years.

Physics & Astronomy

On March 14 (commonly known as Pi Day), eighteen-year-old Reese Peterson, a freshman majoring in physics, broke a BYU record when he correctly recited 806 digits of pi from memory. Using a variety of memorization tactics, Peterson beat his own record later that day when he recited 838 digits. Called to the Thailand Bangkok mission, he plans to beat his own record when he returns.

Students competed in the University Rover Competition in Hanksville, Utah. They spent months building a robot that could work next to a human scientist, and then showed its capabilities in a contest with international competitors. Though the team did not finish first overall, they were only 0.6 points away (on a scale of 100) from the highest score in the Sample Return Task category.

Top Left: The college deans grill up some hotdogs for C2G last spring. **Above:** Students gather before convocation ceremonies in the Wilkinson Student Center. A Y Chem Frisbee team member catches a pass.

Emily Bates, Chemistry & Biochemistry
Emily Bates received funding from the American Headache Society for her research.

Douglas Henderson, Chemistry & Biochemistry
The Journal of Chemical Physics highlighted the research of emeritus professor Douglas Henderson. The journal, which ranks number one in total citations by the ISI, featured the article "Analyzing the components of the free energy landscape in a calcium selective ion channel by Widom's particle insertion method" on their homepage.

Richard Meibos, Chemistry & Biochemistry
Emeritus professor Richard Meibos passed away on May 26, 2011 in Salt Lake City. He taught chemistry for 37 years, was an avid BYU sports fan, and had nine children.

James Thorne, Chemistry & Biochemistry
Former chemistry professor James Thorne passed away on July 21, 2011 at the age of 73. Jim was an accomplished scientist and a well-loved colleague.

New Leadership, Chemistry & Biochemistry
John Lamb is replacing Steven Goates as associate chair.

Bill Hays, Computer Science
Bill Hays, former dean of the college and professor of computer science, passed away on July 19, 2011. Throughout his more than thirty years of service, Bill played a key role in strengthening research and academics in the college.

New Leadership, Computer Science
Mark Clement is replacing Christophe Giraud-Carrier as associate chair. Parris Egbert has been reappointed as department chair for another three-year term.

Jessica Purcell, Mathematics
Jessica Purcell was awarded the prestigious Sloan Research Fellowship. This is only the second time a BYU professor has won the fellowship. Of the twenty fellows chosen this year, she was one of only four women to win an award.

Kirk Tolman, Mathematics
After forty-six years of teaching, Professor Kirk Tolman retired on September 1, 2011.

Gerald Armstrong, Mathematics Education
In January 2011, Professor Gerald Armstrong retired after 35 years as an associate professor.

Keith Leatham, Mathematics Education
Keith Leatham was interviewed for the Mormon Channel radio station program "Insights," where he spoke about how math can be both accessible and entertaining.

New Leadership, Mathematics Education
Dan Siebert is replacing Blake Peterson as associate chair. Steve Williams had been reappointed as department chair for another three-year term.

Karine Chesnel, Physics & Astronomy
Karine Chesnel spoke on nanomagnetics for "Insights," the Mormon Channel radio station program.

J. Ward Moody, Physics & Astronomy
J. Ward Moody was featured in a ***Deseret News*** article about science and religion. As an astronomer and former LDS bishop, the story highlighted Moody's faith in both science and religion.

UPCOMING EVENTS:

STEM Career Fair: Sept. 22, 2011
Summerhays Lecture: Sept. 22, 2011
Honored Alumni Lecture: Oct. 6, 2011
Fall CVLC Meetings: Oct. 7, 2011
Chemistry & Biochemistry Homecoming Dinner: Oct. 7, 2011
Museum of Paleontology Geology Alumni Fieldtrip: Oct. 7, 2011
Physics & Astronomy Dinner and Planetarium Show: Oct. 7, 2011
Geology Alumni Homecoming Breakfast: Oct. 8, 2011
National Chemistry Week: Oct. 16-22, 2011
Computer Science Homecoming Dinner: Nov. 11, 2011
College Awards Banquet: Jan. 19, 2012
Izatt-Christensen Lecture: Feb. 7-8, 2012
Pi Day: March 14, 2012
Spring CLVC Meetings: March 16, 2012
Student Research Conference: March 17, 2012


Dr. Bruce Schaalje presenting at the Summer Institute of Applied Statistics. Photo by Levi Price

Science of Summer 2011

Admin and Staff Retreat: May 13

College staff came together for a day of learning service. Projects included making lunches for the homeless, creating educational sensory books, assembling care packages for soldiers, and tying quilts for those in need.

Astrofest: May 14

Members of the community came to be entertained and educated at this year's Astrofest, hosted by the Department of Physics and Astronomy. Kids of all ages constructed homemade rockets, viewed complimentary planetarium shows, and scanned the night sky through high-tech telescopes.

Open Lab Day: May 14 & 21

The Y Chem club and the Department of Chemistry and Biochemistry gave kids from local schools an exciting introduction to the world of science with dazzling displays, hands-on experiments, and tours of BYU labs and facilities.

Summer Institute of Applied Stats: June 15-17

This year's Summer Institute of Applied Statistics featured Professor G. Bruce Schaalje speaking on the history and function of R.A. Fisher's influential mixed models. This yearly event, put on by the Department of Statistics, draws a crowd of professionals and professors from several fields.

CS BBQ: June 22

At the annual summer BBQ put on by the Department of Computer Science, alumni, faculty, and family relaxed in the warm sun, enjoyed cool treats, and caught up with old friends.

REU: June-August

At REU, the Research Experience for Undergraduates, visiting students from around the country, as well as some BYU students, spent several weeks working closely with professors in research that will help prepare them for graduate school. REU summer programs are offered by both the Mathematics Department and the Department of Physics and Astronomy.

RET: July 6-August 12

The Physics and Astronomy Department gave secondary science teachers an opportunity to participate in a summer research program, Research Experience for Teachers, where they learn to enliven classroom instruction with discussion and hands-on experiments.

TA Training Conference: August 26

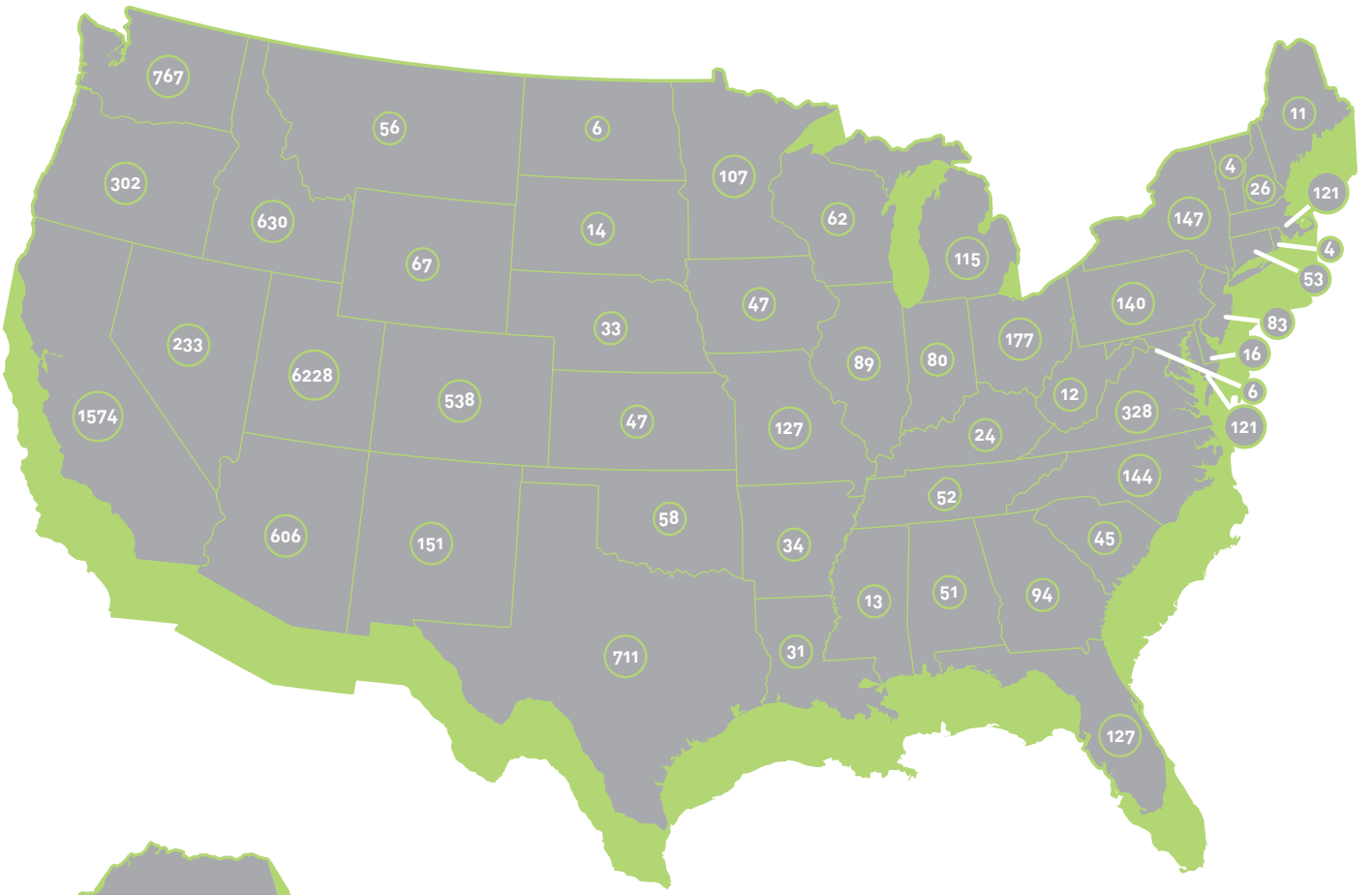
Teaching assistants from the College of Physical and Mathematical Sciences were educated on the ins and outs of the classroom with instruction ranging from grading assignments to proper personal conduct as a BYU employee.

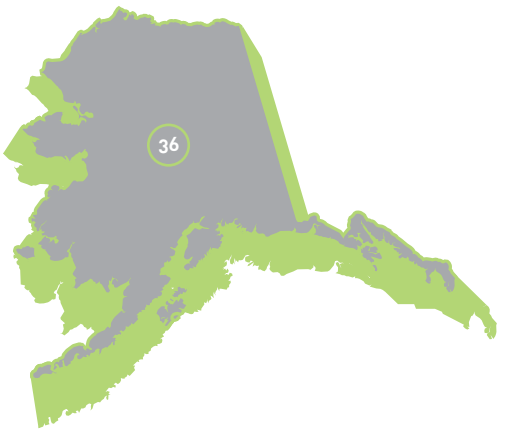
United Way Day of Giving: September 8

Worldwide organization and charity, the United Way, organized a day of giving in which BYU employees volunteered their time and skills to help shape the community through acts of service.

Left: Kids of all ages were treated by CS to a special get-together. *Above:* Dean Scott Sommmerfeldt pitches in for a day of giving. Photos by: Levi Price and BYU Photo.

WHERE IN THE WORLD ARE CPMS ALUMNI





USA: 14,275
Canada: 88
Northern Asia: 65
Armed Forces: 33
Europe: 28
Southeast Asia: 16
Middle East: 12
South America: 9
Micronesia: 6
Caribbean: 5
Africa: 1
Unknown: 348

CONTACT US AND TELL US WHERE YOU ARE! CPMS@BYU.EDU

1971, *Calvin Arnason, Mathematics – Portland, OR*

Calvin is now a consulting QA solution architect. With dozens of clients in North and South America, Australia, and Europe, he currently resides in Medellin, Colombia assisting the largest bank of the country with a complete restructure of their quality processes, products, and training.

1974, *Steve Church, Geological Sciences – Sandy, UT*

Steve and his wife, Barbara, have accepted a call to serve in the Barcelona Spain Mission. They will begin their service in October 2011.

1985, *John Buffington, Mathematics – The Woodlands, TX*

John is employed by Enbridge, a Canadian pipeline company that manages the gathering and shipping of crude oil and gas. He works in trading analysis and valuing derivatives.

1986, *Melinda Trego, Statistics – Mesa, AZ*

Melinda is currently the co-owner of an eye-tracking technology business, EyeTech Digital Systems, Inc., that has had worldwide impact. She has also worked with the capstone programs of BYU's several engineering departments. She attributes her success in business to the education she received from the BYU Statistics Department.

1987, *I. Richard Schaffner, Jr., Geological Sciences – Goffstown, NH*

Richard pursued graduate studies in contaminant hydrogeology. Since that time, he has worked as senior technical specialist with GeoEnvironmental, Inc. (GZA), one of the leading engineering firms in the northeast. He has completed projects throughout the US and the world including Puerto Rico, Japan, India, and Saudi Arabia. He tells friends and colleagues that just as he started his career as a custodian in the Widtsoe Building on campus, he is still doing ostensibly the same thing decades later—cleaning up after people.

2000, *Ken Jennings, Computer Science – Seattle, WA*

After graduating from BYU with a double major in computer science and English, Ken's legendary Jeopardy! streak won him more than $2.5 million. More recently he competed against IBM's supercomputer where he took second place.

2001, *Charity Lander, Geological Sciences – Lawrence, KS*

Charity recently accepted a position as chair of the Geological Society of America's professional development committee for 2011-2012. She is currently pursuing a PhD in biogeochemistry at the University of Kansas.

2004, *Nancy Fulda, Computer Science – Rantrum, Germany*

Nancy was recently awarded the 2011 Jim Baen Memorial award, which is annually given to a science fiction writer whose work demonstrates both exceptional literary quality and stringent scientific accuracy. Her winning story, "That Undiscovered Country," explores developments on mankind's first permanent settlement in space and will appear as the leading story on the Baen Books website later this year. She is now living in Germany with her three children and also running a small online business.

2006, *Chris Monson, Chemistry & Biochemistry – Cedar City, UT*

After graduating cum laude, Christopher received his PhD from UC-Berkley. He recently began working as an assistant professor of chemistry at Southern Utah University.

2006, *Nathan Manwaring, Mathematics – Mountain Green, UT*

Nathan is a senior BI analyst at Equation, a consulting firm that works to improve physician economics in hospitals as well as private and academic settings.

2009, *Kendall Clement, Computer Science – Somerville, MA*

Upon his graduation in computer science with a bioinformatics emphasis, Kendall was awarded an NSF graduate research fellowship. He is currently working on a medical engineering degree at MIT through the Harvard-MIT Division of Health Sciences and Technology.

2009, *Sam Tartakoff, Chemistry & Biochemistry – Irvine, CA*

Samuel is now a graduate student in his second year at the University of California, Irvine. He has been awarded an NSF graduate research fellowship, which will fund the next three years of his program.

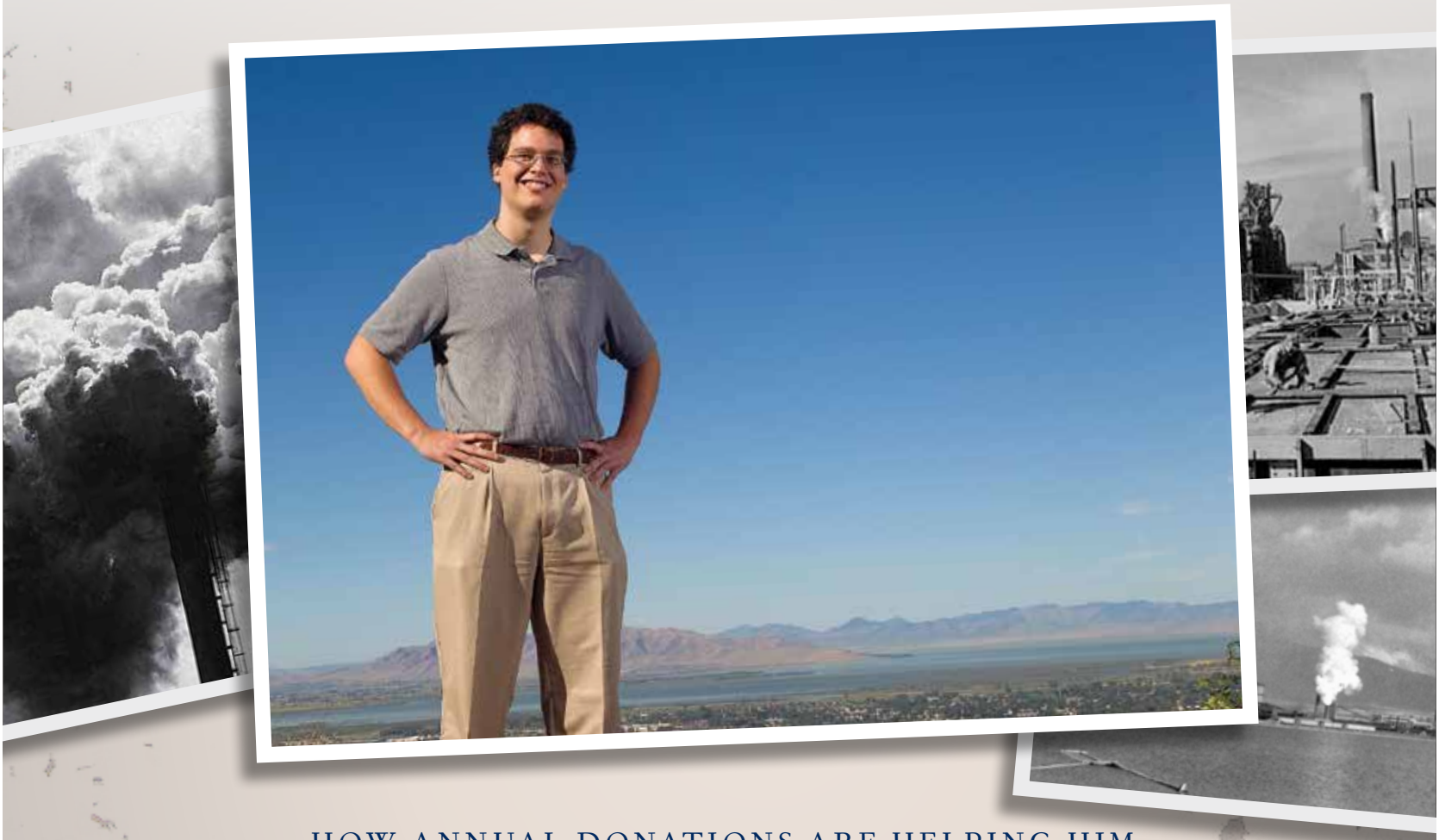
2010, *Enoch Yeung, Mathematics – Pasadena, CA*

Enoch was recently awarded an NSF graduate research fellowship. He is currently working on his PhD at CalTech in the control and dynamical systems program.

BYU College of Physical & Mathematical Sciences

FRONTIERS

Brigham Young University, N181 ESC, Provo, UT 84602



HOW ANNUAL DONATIONS ARE HELPING HIM

CLEAR THE AIR AROUND US

Jonathan Christensen wasn't sure where his BYU education would lead him. Then, thanks to a grant made possible in part by donations, he received an opportunity to join Dr. William Christensen's pollutant research team.

"The research has been an important part of my experience at BYU," says the statistics major from Falls Church, Virginia. "It has challenged me to stretch far beyond my coursework and explore problems that I never would have encountered as an undergraduate student."

Jonathan has enjoyed his mentored learning experience so much that he's now planning further educational endeavors in statistics.

Expressing gratitude to donors, Jonathan says, "Thank you for your support of BYU's exceptional undergraduate research program."

We invite you to help us breathe life into another student's education. Give online at *give.byu.edu/cpms* and please designate the College of Physical and Mathematical Sciences.

BYU

ANNUAL GIVING

To help the college with a special gift, contact Brent Hall at 801-422-4501 *or e-mail* brenth@byu.edu.