



Newsletter

College of Physical and Mathematical Sciences

May/June 2007

In this issue:

New College Dean 1

Dr. Gilbert Fellingham Wins Election 1

May/June External Grants Awarded 2

BYU Students to compete in Mars Rover event 2

Preparing Teachers: Robert Clark 3

Important Dates in the College 4

BYU highest rate of physics teacher grads. 4

College Publications 5

Scott D. Sommerfeldt Named as Dean of College of Physical and Mathematical Sciences



Scott D. Sommerfeldt has accepted an appointment by Academic Vice President John S. Tanner as dean in the College of Physical and Mathematical Sciences at Brigham Young University effective July 1, 2007. He replaces Earl M. Woolley who retired on July 1st.

Introduced to acoustics by his clarinet teacher in high school, Sommerfeldt completed a bachelor's degree in music education and a master's degree in physics at BYU. In 1989, he completed his graduate study at Penn State University where he received his PhD in acoustics. Following his graduation, he accepted a Penn State University faculty position, which he held for six years. He joined the BYU Department of Physics and Astronomy in 1995 focusing in the area of acoustics with much of his research centered on the study of active noise control.

Sommerfeldt and his fellow researchers from General Electric's Aircraft Engine business unit and Hersch Acoustical Engineering received the "Turning Goals into Reality" award from NASA in 1999. In 2002, he was elected a Fellow of the Acoustical Society of America, and in 2004 received the Martin Hirschorn Prize, along with Kent Gee, from the Institute of Noise Control Engineering.

He has published over 60 technical papers and has received funding for his research from both industry and government agencies. Dr. Sommerfeldt has served on the Technical Council of the Acoustical Society of America and on the board of directors of the Institute of Noise Control Engineering. He has served as chair of the BYU Physics and Astronomy department since June 2003.

In addition, associate deans Dana T. Griffen of the Geological Sciences faculty and Thomas W. Sederberg of the Computer Science faculty will continue their service as associate deans.

Dr. Gilbert Fellingham Wins Election

As a result of the 2007 American Statistical Association Election, Dr. Gilbert Fellingham, from the Department of Statistics, has been named Chair-Elect of the Section on Statistics in Sports (SIS) and will function as Chair in 2008 at the meetings held in Denver, Colorado.



Thursday, July 19

CS Annual Games and Grub Summer Social for CS graduates, alumni, faculty and families at locations around Provo. Followed by a barbecue at South Fork Park in Provo.

Thursday, August 16

4pm, August University Commencement.

Friday, August 17

8am, College Convocation, WSC ballroom

August 21– August 24

Education Week

August 27– August 29

University Conference

Friday, August 31

1-4pm, Fall New Student Orientation, 1170 TMCB

May/June External Grants Awarded to Faculty

Department	Faculty	Project Title
Chemistry/Biochemistry	Milton Lee	Portable GC-MS System Development
Chemistry/Biochemistry	Milton Lee	Chemical & Biological Agent Detector
Chemistry/Biochemistry	Brian Woodfield	NIST Summer Research Program (Gaithersburg)
Chemistry/Biochemistry	Brian Woodfield	Energetics of Nanomaterials
Geological Sciences	Rodney Scheetz	Construction of collection Storage Cabinets
Physics and Astronomy	Stephen Turley	REU: Physics Research
Physics and Astronomy	Scott Bergeson	Non-equilibrium Dynamics of Ultracold Neutral Plasmas

BYU students to compete in Mars rover event in southern Utah desert

A group of BYU students competed last month with their prototype of the next generation of Mars rovers – the kind designed to support human expeditions to our neighboring planet.

The Mars Society is hosting the first-ever “[University Rover Challenge](#)” June 1 -2 at the Mars Desert Research Station [near Hanksville, Utah](#). The BYU rover will go up against vehicles from Penn State, UCLA, Nevada–Reno and Ferris State.

During two events, the BYU driver guided the rover to remote sites with the aid of 3-D goggles that receive a video feed from twin cameras mounted atop the vehicle. In the scientific task, the BYU team surveyed an area for signs of life using the cameras and the rover’s mechanical arm.

For the engineering task, the team dispatched the rover to a second area and deployed a radio repeater. Teams earned points if they selected a good location, successfully set up the device, and returned the rover to the finish gate.

The team with the best overall performance won a trip to the 10th Annual International Mars Society Convention in September at UCLA. At the convention, the winners will be awarded a \$5,000 prize.

BYU junior Carlos Pozo, a mechanical engineering student from Bolivia, has his eyes on a bigger prize: a career designing unmanned vehicles. Pozo’s technical role on the project is the rover’s arm, but he says working with a cross-functional team has been the most rewarding part of the experience. Other team members came from a variety of disciplines, including electrical engineering, computer science, and geology.

The project began last fall when Professor David Allred shared an announcement about the contest in his physics class. Since then he has advised the students on the project and helped them line up sponsorship. Allred is impressed with the rover’s lightweight design.

The students considered what features



would be valuable for both the upcoming contest as well as an actual Mars expedition. For example, the breathable canvas cover helped the internal system keep cool in the southern Utah heat and also protected sensitive parts from the blowing sands of Mars. With cargo space limited on a Mars voyage, the students came up with a design that packs up neatly and requires few spare parts.

Federal health research investment would transform aging workforce

Duke–BYU study sees path to boosting economy, sustaining Medicare (BYU News)

A new report recommends tripling the federal government's funding of health research to extend the productivity of an aging workforce.

The study found that the gains from a greater investment in biotechnology and medicine will offset the rising costs of programs like Medicare that must expand to meet the needs of baby boomers in their later years. Brigham Young University statistician Dennis Tolley crunched the numbers for the report published Tuesday in the *Proceedings of the National Academy of Sciences*. Tolley's collaborators on the study include researchers at Duke University and the National Council of Spinal Cord Injury Association.



Dennis Tolley

health care costs have increased," Tolley said. "Although none of us would like to return to the level of medicine practiced even 20 years ago, we are frustrated with the high cost of health care. This research shows that medical technology is also increasing the wealth of the nation."

The baby boomer generation is driving up the average age in the U.S., but the workforce is aging at an even faster rate as young people enter the workforce later in life. To maintain growth in a more competitive global economy, U.S. workers will need to remain productive well beyond the age of 65.

"One of the key deterrents to working past retirement age has been the health of the individual," Tolley said. "Technological advances are reducing this problem. As a result, seasoned, skilled, and technical individuals can now remain in the work force longer, producing great wealth for their immediate families and for society in general."

"Many people feel that the rapid increase in technology is one of the main reasons

Tolley, who is an actuary, fed economic and demographic data from prior national surveys and studies into a mathematical model to predict the state of the future U.S. economy. They found that the optimal level of research investment is 12.8 percent of gross domestic product, equal to \$1.6 trillion yearly. Current funding for organizations such as the National Institutes of Health is about one-third of the optimum.

According to the authors, additional investments in research would yield discoveries that increase both life expectancy and the length of time workers remain active. The resulting economic boost would generate new tax revenue and savings in rate of increase in Medicare payments that will more than cover a doubling of the biomedical research at the National Institutes of Health and the National Science Foundation from 2009 to 2014.

Preparing Teachers: Prime Mover, Robert Clark

It was 1969, and physicists with newly minted Ph.D.s were allegedly driving taxis because they couldn't find academic positions. So BYU physicist Robert Bent Clark, then a junior faculty member at the University of Texas, decided to expand young physicists' career choices. He scoured the country and came up with 75 job openings for high school science teachers. Then he posted those openings--more than the total from academia--at the job fair during the next meeting of the American Physical Society in a performance that elicited gasps from older members but heartfelt thanks from the ranks of his unemployed colleagues. The effort also launched Clark, a particle theorist, on a parallel 30-plus-year career in physics education that would include the presidency of the American Association of Physics Teachers.

The avuncular Clark has never worried about going against the grain: At Yale, where he earned his undergraduate and graduate degrees, he chuckles that "I was known as the married Mormon football player." And when a faculty opening in 2000 gave him and his wife a chance to return to Utah, Clark says that "I think they were expecting to hire someone right out of grad school. But they went with a graybeard."

His colleagues say Clark is the tinder that has rekindled the university's commitment to preparing physics teachers. And when the education department handed over its slot to the College of Physical and Mathematical Sciences, Clark called up Merrell and twisted his arm to apply.



CREDIT: MARK A. PHILBRICK/BYU

Science | June 2007:
Vol. 316, no. 5829, p. 1272
DOI: 10.1126/
science.316.5829.1272b

New chair and associate chair named for BYU Department of Geological Sciences

Scott M. Ritter has accepted an appointment to serve as Chair of the BYU Geological Sciences Department effective July 1, 2007. Ritter replaces Jeffrey D. Keith who was recently named as the new BYU Associate Academic Vice President for Undergraduate Studies.



John H. McBride has been appointed to serve as the Associate Chair of the department. McBride obtained a B.S. in Mathematics and Geology from the University of Arkansas in 1978, an M.S. in Geology from the same institution, and a Ph.D. in Geophysics in 1987 from Cornell University. He worked in the petroleum industry (Amoco International Oil Co. and Shell Offshore, Inc.) for four years, and also spent five years at the British Institutions Reflection Profiling Syndicate, University of Cambridge. McBride joined the BYU Geological Sciences Department in August 2002. His research interests include acquiring, processing, and interpreting geophysical data, particularly seismic reflection data.

Scott M. Ritter received his B.S. (1981) and M.S. (1983) degrees in Geology from Brigham Young University. He then attended the University of Wisconsin-Madison where he completed his Ph.D. in 1986. He subsequently taught at Oklahoma State University for five years before joining the BYU Geological Sciences faculty in 1991. His research specialties include micropaleontology and carbonate sedimentology. Recent research activities are focused upon development of a sequence biostratigraphic (conodont and fusulinid) framework for correlation of Pennsylvanian-Early Permian depositional sequences in basins located along the western margin of Pangaea and upon sedimentology of modern ooid shoals in the Bahamas.

Dr. Ritter is married to the former Kathie Murdock. They are the parents of four children and two grandchildren.

Ross L. Spencer named Chair of the BYU Physics & Astronomy Department

Ross L. Spencer has accepted an appointment to serve as Chair of the BYU Physics & Astronomy Department effective July 1, 2007, with Harold Stokes serving as Associate Chair. Dr. Spencer replaces Scott D. Sommerfeldt who was recently named as the Dean of the College of Physical & Mathematical Sciences.

Dr. Spencer received his BS in Physics from Brigham Young University in 1974. He then attended the University of Wisconsin, Madison receiving both his MS (1976) and PhD (1979) degrees in Physics. After completing his PhD, Dr. Spencer was employed for 5 years by the Los Alamos National Laboratory in New Mexico doing research in magnetic fusion energy. He joined the BYU Physics & Astronomy Department in 1984. He has been active in teaching and research throughout his career receiving the Karl G. Maeser Excellence in Teaching Award in 1997. His research is in the area of plasma physics and gas dynamics.

Dr. Spencer is married to the former Margo Eatough. They are the parents of five children and four grandchildren.



BYU has highest rate of physics teacher grads

BRITTANI LUSK - Daily Herald

Monday, June 11, 2007

Brad Moser discovered he loved to teach while he was in South Africa serving as a missionary for The Church of Jesus Christ of Latter-day Saints.

"I just really enjoyed preparing lessons for people," Moser said.

Moser graduated from Brigham Young University in December, spent the rest of the school year in Provo waiting for his wife to graduate and will head to Missouri in the fall to take a job teaching high school physics.

Finding physics teachers at the high school level is no easy task, but in 2006, 16 students graduated from BYU with degrees in physics and teaching certificates. It's the largest group by far of potential physics teachers graduating from any college in the country.

One reason BYU's numbers may be high are that many of the physics teaching students have served missions, and, like Moser, have learned to love teaching.

Another reason is Duane Merrell. Merrell is an assis-

tant teaching professor in the physics and astronomy department who works with the teaching students.

Dana Griffen, the associate dean of the College of Physical and Mathematical Science, said Merrell is dynamic, and that his teaching keeps students in the program.

"I think he does a lot of retain them and move them forward," Griffen said.

Robert Clark, a professor of physics and astronomy, mentions Merrell as well.

"We have a dynamite program that Duane Merrell runs that the students find very attractive," Clark said.

It also could be that BYU provides an environment where students who choose to teach are supported. Clark said BYU tries hard to remind students that teaching is an option with a physics degree. They are reminded when they enter the program and in physics classes afterward.

Clark said some students



come in wanting to be teachers. Others decide later, but students can decide as late as their junior year and not lose any time. Merrell said the junior year is when most students decide they want to teach.

Griffen said training teachers is important because most students must be exposed to science in high school to have an interest in the subject in college.

"To stay in competition with other countries we have got to have a generation of students and teachers who are science and math literate," Merrell said.

Moser agrees that students need a base in high school to find a love of science in college, and he plans to keep his classrooms dynamic.

"We don't just do Powerpoints and lectures," Moser said.

This story appeared in The Daily Herald on page A1 on June 11, 2007.

College Publications

Chemistry and Biochemistry

A. Arafat, M. Giesbers, M. Rosso, E.J.R. Sudholter, K. Schroen, R.G. White, L. Yang, M.R. Linford, and H. Zuilhof, "Covalent Biofunctionalization of Silicon Nitride Surfaces," *Langmuir*, **23**(11), 6233-6244 (2007).

D. Boda, M. Valisko, B. Eisenberg, W. Nonner, D. Henderson, D. Gillespie, "The Combined Effect of Pore Radius and Protein dielectric coefficient on the Selectivity of a Calcium Channel," *Physical Review Letters*, **98**, Article No. 168102 (2007).

Computer Science

M. Al-Muhammed and D.W. Embley, Ontology-based constraint recognition for free-form service requests, Proceedings of the 23rd International Conference on Data Engineering (ICDE 2007), Istanbul, Turkey, 16--20 April 2007, 366-375.

Eric Ringger, Peter McClanahan, Robbie Haertel, George Busby, Marc Carmen, James Carroll, Kevin Seppi, Deryle Lonsdale. 2007. "Active Learning for Part-of-Speech Tagging: Accelerating Corpus Annotation". In Proceedings of the Linguistic Annotation Workshop, in conjunction with ACL 2007, Prague, Czech Republic.

Daniel P. Delorey, Scott Chun, and Charles D. Knutson. "Do Programming Languages Affect Productivity? A Case Study Using Data from Open Source Projects." / Proceedings of the First International Workshop on Emerging Trends in FLOSS Research and Development (FLOSS 2007)/, Minneapolis, Minnesota, May 21, 2007.

Daniel P. Delorey, Charles D. Knutson, and Christophe Giraud-Carrier. "Programming Language Trends in Open Source Development: An Evaluation Using Data from All Production Phase SourceForge Projects." / Proceedings of the Second Workshop on Public Data about Software Development (WoPDaSD 2007)/, Limerick, Ireland, June 14, 2007.

Daniel P. Delorey, Charles D. Knutson, and Alex MacLean. "Studying Production Phase SourceForge Projects." / Proceedings of the Second Workshop on Public Data about Software Development (WoPDaSD 2007)/, Limerick, Ireland, June 14, 2007.

Geology

Thompson, K., Bickmore, B. R., Graham, C. R., & Yanchar, S. C. (2007). Earth science mini-lessons: A service-learning strategy for improving attitudes toward science of preservice elementary teachers. *Journal of Geo science Education*, 55(3), 228-234.

Physics and Astronomy

J. Peatross, C. Müller, and C. H. Keitel, "Electron wave-packet dynamics in a relativistic electromagnetic field: 3-D analytical approximation," *Opt. Express* **15**, 6053-6061 (2007).

P. Fendel, S. D. Bergeson, T. Udem, and T. W. Hänsch, "Two-photon frequency comb spectroscopy of the 6s-8s transition in cesium," *Optics Letters* **32**, 701-703 (2007)

L. Lytle, X. Zhang, J. Peatross, M.M. Murnane, H.C. Kapteyn, and O. Cohen, "Probe of high-order harmonic generation in a hollow waveguide geometry using counterpropagating light," *Phys. Rev. Lett.* **98**, 123904 (2007)

Statistics

Lingwall, J.W. and Christensen, W.F., "Pollution source apportionment using *a priori* information and positive matrix factorization," *Chemometrics and Intelligent Laboratory Systems*, **87**, 281-294, (2007).

Pyne, M.I., Rader, R.B., and Christensen, W.F., "Predicting local biological characteristics in streams: a comparison of landscape classifications," *Freshwater Biology*, **52**, 1302-1321, (2007).

Wilson, A.G., Graves, T.L., Hamada, M.S. and Reese, C. S., "Advances in System Reliability," *Statistical Science*, **21**, 514-531, (2006).