



In this issue:

Utah native gets mention at Nobel	1
Geology Brochure	1
Chemistry's Graduate School Fair	1
External Grants	2
Mentoring Model Spreads	2
Alumni recognized during Homecoming	2
CS Homecoming Dinner	3
Cancer Drug	3
Dates & Events	3
College Publications	4

Newsletter

College of Physical and Mathematical Sciences

October 2006

Utah native gets mention at Nobel



Joe Bauman
Deseret Morning News
October 6, 2006

When the Nobel Prize in chemistry was awarded Wednesday to Stanford University's Roger Kornberg, prize officials in Stockholm, Sweden, also mentioned research contributions by Utah

native Ken Westover.

Kornberg's Nobel Prize was for advances in understanding the way "genetic information stored in our genes is copied so that the body can make use of it," the Nobel Committee announcement said. "This is a process central to all life — if it stops, the organism soon dies."

Information about the award, posted on the Web at nobelprize.org, cites three original scientific articles and one review article by Kornberg on the subject. One in each category cites Westover as co-author.

Westover, 32, was born in Cedar City and is a graduate of Brigham Young University. At Stanford, he is a member of Kornberg's laboratory team.

He grew up in various cities, attended high school in California, and spent his undergraduate years at BYU, where he graduated in 1999. Since then, he has obtained a Ph.D. at Stanford, and he's soon to earn an M.D. degree.

After he entered Stanford, Westover began working in Kornberg's laboratory, just as other lab members were

completing their breakthrough work.

"I could not have been more fortunate, in terms of the timing, when I joined the lab," Westover said Thursday in a telephone interview.

He happened to become part of the lab team through a lucky circumstance. He stayed with a friend at Stanford when he was interviewing for graduate school. The friend, who was in Kornberg's lab, showed him the facility.

"I knew that if I could get in anywhere, I wanted to be in Roger's lab," Westover added. "The science was just amazing, and he's a remarkable person."

Just as Westover was joining the laboratory in 2000, longtime researchers who had worked on important papers were leaving for appointments at other universities. Under Kornberg's tutelage, Westover began working on the next stage of research, and his work was an important advance.

"I was only able to do that because of the hard work of many people before that, as many as 30 years before," Westover said.

Dan Simmons, who was his professor of chemistry and biochemistry at BYU, recalls Westover as a talented violinist and a yell leader for BYU. Westover's wife, Camille Williams Westover, is a pianist, and they played at convocation. When Simmons taught an advanced course for seniors and graduate students, Westover — a sophomore at the time — finished near the top of the class.

"He was outstanding by any measure," Simmons said. "It's not often one has a student like Ken."

Chemistry's Graduate School Fair

On Thursday October 12, YChem, the undergraduate organization in the Department of Chemistry and Biochemistry sponsored its 3rd Annual Graduate School Fair. Representatives from chemistry and biochemistry graduate programs were invited to attend the event and tell perspective graduate students about their graduate programs. The event provides an opportunity both for students considering graduate school to

find out about various graduate programs, as well as an opportunity for graduate programs to recruit BYU students into their program.

Representatives from 14 graduate programs attended the event. Graduate programs that attended included UC San Diego, UC Santa Barbara, UC Davis, University of Utah, Utah State University, University of Oregon, University of Washington, Washington State Univer-

sity, University of Illinois, Michigan State University, Texas A&M University, University of Texas Southwestern, Clemson University, and Brigham Young University. A total of about 70 perspective graduate students attended the event. In addition to students from BYU, perspective graduate students were invited to attend from Weber State, USU, Utah, Westminster College, UVSC, and SUU.

September External Grants awarded to Faculty

Department	Faculty	Project Title
Chemistry and Biochemistry	Jaron C. Hansen	Water Vapor Dependence of the Reaction Kinetics of the Methylperoxyl Radical w/ Hydroperoxyl and Itself
Chemistry and Biochemistry	Matt Linford	Research Collaboration
Chemistry and Biochemistry	Paul Savage	Using Lipids for Vaccination
Chemistry and Biochemistry	Paul Savage	ADV N

BYU Math Department to spread mentoring model to other schools

\$1.3 million NSF grant will fund effort (Y News Article)

When it comes to mentoring undergraduate mathematics students, Brigham Young University professors are leading the way. And thanks to a \$1.3 million grant from the National Science Foundation, they will be showing that way to scholars at other universities.

"Traditionally, math research has consisted of a professor sitting behind a desk and thinking," said Tyler Jarvis, chair of the BYU Mathematics Department. "It's hard to involve graduate students in that, let alone undergraduates."

Four years ago, encouraged by the Mentoring Environment Grant program established by BYU's Office of Research and Creative Activities, many professors in the BYU Mathematics Department sought and developed innovative new ways to mentor undergrads.

Specifically, they established four research groups consisting of three to five undergraduates, one graduate student, and one to three BYU faculty members. The groups involve undergraduates in mathematical research, challenge them beyond what they see in the classroom, and give them personal attention from faculty members.

"The new groups have been very fruitful – so far undergraduates have presented 53 times at conferences, 15 students wrote research papers with their professors and 37 out of a possible 39 went on to graduate school," said Michael Dorff, principal investigator on the NSF grant. "The other 14 participants are still undergraduates."

Now Dorff and his colleagues will use the NSF grant money to bring their counterparts at other universities to BYU to train them how to set up groups of their own, as well as administer a mentoring grant program modeled after BYU's.

"We'll give out mini grants each year to about 15 other professors at various institutions in the United States," said Dorff. "More than 100 professors have heard about the program and have e-mailed me expressing interest."

Joseph Gallian, the president-elect of the Mathematical Association of America, said, "I am confident that [this] program ... will be a wonderful success in helping students prepare for graduate study and in helping faculty develop the skills needed to engage students in original research."



Math professor Michael Dorff (middle) mentors Laura Cannon and Brian Rushton. BYU will use a \$1.3 million grant from the NSF to teach scholars at other universities how to mentor math students.

Computer Science Alumni Recognized during Homecoming Week



Dallen Quass (BS '86, MS '88), a Computer Science alum and former president of the Computer Science Alumni Association, was honored Thursday, October 19 as the 2006 College Honored Alumni Speaker for the College of Physical and Mathematical Sciences. Dr.

Quass spoke in room 1170 of the Talmage Building as part of the 2006 Homecoming festivities. His address, entitled "Trust in the Lord," looked at his experiences and the journey he took through schooling and in the industry in light of the scripture Proverbs 3:5-6: "Trust in the Lord with all thine heart; and lean not unto thine own understanding. In all thy ways acknowledge him, and he shall direct thy paths."

After years of schooling, teaching and entrepreneurship, Dallen W. Quass is actively working in the community through his non-profit organization, the Foundation for On-Line Genealogy.

Quass received two degrees in computer science from BYU, and after working as a computer programmer for a few years, he received a PhD in computer science at Stanford ('97). While there he interacted with many eminent computer scientists, including Donald Knuth, a professor whose devotion to his Lutheran faith inspired Quass to stand firm in his own spiritual convictions within academic circles.

Jeff Ullman, a faculty member in his research group at Stanford, told Quass the best way to have an impact on the world would be to influence others with research and to create a startup company from successful studies. Quass has done just that.

Today he is among the top 1,000 most-cited computer science authors. At Stanford he was a co-founder of Jungle, which was later sold to Amazon.com. He accepted a faculty position at BYU to teach information systems, and later left teaching to co-found another startup company, Whizbang Labs!, later acquired by Monster.com.

Quass spent a few years as the CTO of the Family

History Department for the LDS Church. His desire to help others prompted him to begin a non-profit company with family. Called the Foundation for On-Line Genealogy, the family hopes their free website, WeRelate.org, will help others search for their ancestors and share what they know about their personal heritage with others.

He is married to Solveig Phillips Quass (BS '81, JD '85) and together they have five children.

Dr. Quass' wife, their five children, and his parents, who are currently serving a mission in the Family History Library, were in attendance.

Dean Woolley of the College of Physical and Mathematical Sciences conducted the meeting. Previous to his address, Dr. Quass was presented with an award in recognition of his accomplishments by Blake Durtschi, former president of the BYU chapter of the Association for Computing Machinery.

Important Dates and Events in the College

November 2006

Thursday, November 2

Chemistry Seminar, Matt Beard, Physical Chemistry 4PM W140 BNSN

CS Colloquim, Eric Mercer, "Why Grad School?" 11AM 1120 TMCB

Friday, November 3

Math Annual UVSC Integration Bee 3PM at UVSC

Monday, November 6

Chemistry Seminar, Dave Tierney, Bioinorganic Chemistry 4PM W140 BNSN

Thursday, November 9

Chemistry Seminar, Jennifer Shumaker-Parry, Analytical/Physical Chemistry 4PM W140 BNSN

CS Colloquim, Rich Caruana 11AM 1120 TMCB

Geology Seminar, Ron Harris, "Tectronics" 11AM C295 ESC

Math Seminar, M. Ray Murty, Number Theory 10AM 323 TMCB

Monday, November 13

Chemistry Seminar, John Tesmer, Biochemistry 4PM W140 BNSN

Tuesday, November 14

Statistics Seminar, Kevin Seppi

Wednesday, November 15

Physics Colloquim, Jacob Fugal, Michigan Technological University 4PM C215 ESC

Thursday, November 16

CS Colloquim, Raymond Mooney, "Learning to extract proteins & their interactions from Biomedical Text" 11AM 1120 TMCB

Geology Seminar, Barry Bickmore, "Mineralogy" 11AM C295 ESC

Tuesday, November 21

Friday Instruction

Thursday, November 23

Thanksgiving

Friday, November 24

No classes

Tuesday, November 28

Statistics Seminar, Natalie Blades

Thursday, November 30

Chemistry Seminar, Marc Bühler, Biochemistry 4PM W140 BNSN

Geology Seminar, Tom Morris, "Stratigraphy and Petroleum Geology" 11AM C295 ESC



Computer Science Homecoming Dinner

By Kiersten Kariya

We had a great homecoming dinner for our alumni and faculty and their families on Friday, October 20. It was originally slated to take place in the courtyard of the JFSB, however, the threat of inclement weather resulted in a change of venue. We were able to use the Terrace at the Wilkinson Center, and it worked perfectly. We had about 225 faculty, alumni, and their families attend. Attendees chose from pitas with meat and vegetables, soup and a potato bar with all the fixins', a pasta bar with chicken, Alfredo or marinara, and bread sticks, and a kid's buffet with hot dogs, chicken strips, and macaroni and cheese. Guests chatted and ate with the colorful sounds of "Pickin' on Molly," a local bluegrass band, playing in the background. Parents were able to talk

and mingle while their kids entertained themselves with coloring books and crayons and the ever-popular camera toy, a software program created by three CS students which, when hooked up to a camera, uses algorithms to track movements and turn them into fun, interactive images which can then be projected onto a monitor or screen. During the course of the evening, Dr. Bill Barrett highlighted some of the department's accomplishments from this last year, noting Dr. Tom Sederberg's Computer Graphics Achievement Award from ACM SIGGRAPH and Dallan Quass' invitation to be the College Honored Alumni Speaker. We were pleased to have such a great turnout and were grateful for the opportunity to reunite with so many of our talented and successful alumni. We look forward to doing it again next year.

BYU develops better way to make cancer drug

FDA also approves fast-track testing of drug for MS treatment (Y News Article)

Brigham Young University researchers have developed an improved method for making a drug called "[cladribine](#)" that has proven effective against certain types of cancer, including [hairy cell leukemia](#), which affects as many as 800 patients a year.

In [related news](#), pharmaceutical company Serono recently received "[fast-track](#)" status by the [Food and Drug Administration](#) for testing its new oral cladribine treatment for [multiple sclerosis](#), which affects 2 million people worldwide.

[Morris J. Robins](#), the J. Rex Goates Professor of Chemistry, led BYU's efforts to devise the more effective way of synthesizing cladribine.

Joined by graduate student Ming-hong Zhong and postdoctoral fellow Ireneusz Nowak, Robins published his laboratory's improved method this fall in [The Journal of Organic Chemistry](#).

"It's very gratifying to know that

something we do in the laboratory may be used to improve the condition of others," said Robins, whose past research and discoveries have contributed to the fight against AIDS and hepatitis B.

Arthur D. Broom, professor of medicinal chemistry and associate dean for research at the University of Utah's College of Pharmacy, said that Robins is one of the world leaders in the area of nucleoside chemistry. [Nucleosides](#) are the building blocks of DNA and RNA, which carry a person's genetic information.

"A problem with cladribine and many similar drugs is that they are very difficult and expensive to make, largely because the chemical syntheses involved result in the formation not of just the desired drug, but several related, but useless, chemical compounds," said Broom.

"Dr. Robins has found a novel, relatively inexpensive and highly

specific way to eliminate the formation of these unwanted byproducts, giving the pure cladribine as the sole compound," added Broom. "This is a very significant advance in making important drugs available at reasonable cost."

BYU's new patent-pending method may be of interest to pharmaceutical companies that produce cladribine.

Piet Herdewijn, professor of medicinal chemistry at the Rega Institute for Medical Research in Belgium, a leading laboratory for antiviral research, said Robins' method is creative and represents an important discovery in the "difficult" field of nucleoside synthesis.

"A good method to synthesize cladribine is important for industries that produce this compound, and even more important to the patients that need the drug for treatment," said Herdewijn. "Dr. Robins' methodology has no precedent in the field and brings the technology near to perfection."

BYU Alumni Fieldtrip — Covenant Field

Bill Keach and John McBride

The Covenant Field is the largest Rocky Mountain discovery in 30 years. It has regenerated significant interest in the Utah overthrust belt. The big field had eluded the many companies that had explored and drilled in the area. In 1999 Wolverine Oil and Gas acquired lease acreage and seismic data for the area from Chevron, who had worked the area for over 50 years. Wolverine's geoscientists developed a new prospect that they attempted to sell to 65 potential partners in 2001-2003. Unsuccessful they turned to friends, family and local investors. They drilled the first well, the 17-1 Kings Meadow Ranches in late 2003, encountering more than 500 feet of oil bearing Navajo Sandstone. Today they produce about 6,000 barrels per day of high gravity, 39.7 API, sweet oil from 10 wells.

It was to this stunningly successful discovery that 17 BYU Geology alumni and friends visited on October 19 as part of 2006 Homecoming. It was a great day to be outdoors with mild temperatures and clear skies. Our first stop on this trip was to visit an exploration well that is actively

drilling for another new discovery a few miles away. Getting to see close-up an active drill rig was a first for several on the trip.

The operators of the rig were kind enough to allow us on the premises as they shared some of the details of how a well is drilled.



Visiting the Wolverine 10-1 exploration well. They are actively drilling in hopes of finding another discovery in the area of the Covenant Field. This well was 11,500 feet deep at the time of our visit.

Our next stop was the field itself where the operations manager, Tony Cook, provided us a great tour of the collection facilities and the drill site itself. Tony patiently and expertly answered every question we had about the history and the operations of the field. We learned that without a pipeline they load and ship out about 1 oil tanker truck every hour every day of the year. Lunch was at the field site where we shared oil field stories of the area.

Special thanks go out to Frank Turner, Mike Pinnel, Bill Lewis and Floyd Moulton. Frank and Mike provided expertise on the local geology and drilling activity. Floyd, though not in attendance, provided most of the maps and cross-sections provided to the attendees as handouts. The assistance of these fine alumni and gentlemen made the trip an outstanding success.

Geology Brochure

Authors Tom Morris & Scott Ritter, of Geological Sciences, have recently published their third brochure on the geology of National Parks in and around Utah. "Geology Unfolded: Arches National Park" is the third in a projected series of 6 brochures that address the public's most commonly asked geologic questions. The tri-folded brochures of the Geology Unfolded series to date include Capital Reef National Park, Glen Canyon National Recreation Area and Arches National Park. The authors hope to finish the series in the next 2 years. The series will include Zion National Park, Bryce Canyon National Park and Grand Canyon National Park.

College Publications

Chemistry

B.D. Grover, C.B. Carter, M.A. Kleinman, J.S. Richards, N.L. Eatough, D.J. Eatough, P.K. Dasgupta, R. Al-Horr, S.M.R. Ullah, "Monitoring and Source Apportionment of Fine Particulate Matter at Lindon, Utah" *Aerosol Sci. Technol.*, 941-951 (2006).

D.J. Eatough, R.R. Anderson, D.V. Martello, W.K. Modey, N.F. Mangelson, "Apportionment of Ambient Primary and Secondary PM_{2.5} During a 2001 Summer Intensive Study at the NETL Pittsburgh Site Using PMF₂ and EPA UNMIX" *Aerosol Sci. Technol.*, 925-940 (2006).

T.F. Mar, K. Ito, J.Q. Koenig, T.V. Larson, D.J. Eatough, R.C. Henry, E. Kim, F. Laden, R. Lall, L. Neas, M. Stölzel, P. Paatero, P.K. Hopke, G.D. Thurston, "PM Source Apportionment and Health Effects. 3. Investigation of Inter-method Variations in Associations Between Estimated Source Contributions of Pm_{2.5} and Daily Mortality in Phoenix, AZ". *J. Exposure Science Environ. Epidemiol.*, 16, 311-320 (2006).

F. Zhang, P. Halverson, B. Lunt, M.R. Linford, "Wet Spinning of Predoped Polyaniline into an Aqueous Solution of a Polyelectrolyte," *Synthetic Metals*, 156 (14-15), 932-937. (2006). (A figure from this paper appeared on the cover of the issue it appeared in.)

A.A. Parent, T.M. Anderson, D.J. Michaelis, G. Jiang, P.B. Savage, M.R. Linford, "Direct ToF-SIMS Analysis of Organic Halides and Amines on TLC Plates," *Applied Surface Science* **252**, 6746-6749 (2006).

M.V. Lee, M.T. Hoffman, K. Barnett, J.-M Geiss, V.S. Smentkowski, M.R. Linford, R.C. Davis, "Chemomechanical Nanolithography: Nanografting on Silicon and Factors Impacting Linewidth," *J. Nanosci. Nanotechnol.*, 6, 1639-1643 (2006).

M.V. Lee, J. Richards, M.R. Linford, S. Casey, "Chemomechanical Modification of Silicon with Gas Phase Reagents," *J. Vac. Sci. Tech. B.*, 24(2); 750-755 (2006).

M.J. Robins, K. Miranda, V.K. Rajwanshi, M.A. Peterson, G. Andrei, R. Snoeck, E. De Clercq, J. Balzarini, "Synthesis and Biological Evaluation of 6-(Alkyn-1-yl)furo[2,3-d]pyrimidin-2(3H)-one Base and Nucleoside Derivatives" *J. Med. Chem.*, 49, 391-398 (2006).

M.A. Peterson, H. Shi, P. Ke, P. "A Simple and Efficient Biphasic Method for the Preparation of 4-Nitrophenyl N-Methyl- and N-Alkylcarbamates," *Tetrahedron Lett.*, 47, 3405-3407 (2006).

Computer Science

Y. Ding, D.W. Embley, and S.W. Liddle, Automatic creation and simplified querying of semantic web content: An approach based on information-extraction ontologies, Proceedings of the 1st Asian Semantic Web Conference (ASWC 2006), Beijing, China, 3-7 September 2006, 400-414.

Mathematics

Jeffrey Humpherys and Kevin Zumbrun, "An efficient shooting algorithm for Evans function calculations in large systems," *Physica D*, Vol. 220, 116-126 (2006).

James W. Cannon and W. Dicks, "On hyperbolic once-punctured-torus bundles II. Fractal tessellations of the plane," *Geometriae Dedicata*, <http://dx.doi.org/10.1007/s10711-006-9070-3> (2006).

James W. Cannon and W. Dicks, "On hyperbolic once-punctured-torus bundles II. Fractal tessellations of the plane," *Centre de Recerca Matemàtica*, Vol. 633, 1-72 (2005).

Physics and Astronomy

William R. Evans, Sarah C. Barton, M. Clemens and David D. Allred, "Understanding DC-Bias Sputtered Thorium Oxide Thin Films Useful in EUV Optics [6317-37]," in: *Advances In X-Ray/EUV Optics, Components, And Applications*, edited by Ali M. Khounsary, and Christian Morawe, *Proceedings of SPIE*, **6317**, 631711-1 to 8 (2006)..

Nicole F. Brimhall, Amy B. Grigg, R. Steven Turley, and David D. Allred, "Thorium-based mirrors in the extreme ultraviolet," [6317-36] in: *Advances In X-Ray/EUV Optics, Components, And Applications*, edited by Ali M. Khounsary, and Christian Morawe, *Proceedings of SPIE*, **6317**, 631710-1 to 8 (2006).

N. F. Brimhall, A. Baker, R. S. Turley, J. Peatross, "Construction of an Extreme Ultraviolet Polarimeter Based on High-Order Harmonic Generation," [6317-34], in: *Advances In X-Ray/EUV Optics, Components, And Applications*, edited by Ali M. Khounsary, and Christian Morawe, *Proceedings of SPIE*, **6317**, 63170Y-1 to 7 (2006).

D. D. Allred, G. A. Acosta, N. Farnsworth-Brimhall, and R. S. Turley, "Simultaneous Reflection and Transmission Measurements from Coated Diodes to Determine the Optical Constants of Thin Films in the Extreme Ultraviolet," 49th Annual Technical Conference Proceedings, Washington, DC, April 22-27, 2006, Vol. 49, (Society of Vacuum Coaters, Albuquerque, NM, 2006) 314-318.

Statistics

Van Orden, R., Eggett, D.L., Franz, K. B., "Influence of graded magnesium deficiencies on white blood cell counts and lymphocyte subpopulations in rats," *Magnesium Research*, **19** (2): 93-101, (2006).

Lawson, J.S., Liddle, S.W., and Meade, D., "Implementing Legacy Programs for Quality Engineering in a Spreadsheet Environment," *Quality Engineering*, **18**:503-522, (2006).

Lawson, J.S., and Gatlin, J., "Finding Bad Values in Factorial Designs-Revisited," *Quality Engineering*, **18**:491-501, (2006).