



# Newsletter

College of Physical and Mathematical Sciences

October 2007

## Elder Richard G. Scott Dedicates BYU Planetarium

By Valerie Fry - 4 Oct 2007  
BYU NewsNet



Elder Richard G. Scott dedicated the newly named Royden G. Derrick Planetarium on Sept. 28.

The new planetarium will be an effective tool in helping students to appreciate "the numberless works of our Father in Heaven and His infinite capacity to bless His children," said Elder Scott, a member of the Quorum of the Twelve Apostles of The Church of Jesus Christ of Latter-day Saints.

Elder Scott was accompanied by several other general authorities including: Elder Rolfe G. Kerr, Elder Merrill J. Bateman, and Elder John K. Carmack. Also present was BYU President Cecil O. Samuelson, Elder Derrick, his wife Allie, and many of their family members.

The planetarium, previously named after Sarah B. Summerhays, was renamed on Friday after Royden G. Derrick, a prominent industrialist, engineer and former member of the Quorum of the Seventy.

The new planetarium was made possible by David Derrick, Royden's son, and his wife, Marsha, who have been long-time supporters of the BYU Department of Physics and Astronomy and helped in renaming the planetarium after David's father.

"This facility will bridge the gap between science and religion," David Derrick said in a BYU news release.



The planetarium is designed for public stargazing demonstrations and also for a classroom. The planetarium was redesigned in 2005 with special features to reduce the echoes in the previous dome structure. It seats 120 people; 80 more seats than the old planetarium.

A new star projector was installed in 2005 that can project all the stars visible to the naked eye and those that require binoculars. The projector is so precise that it allows lecturers to reproduce the position of stars and planets at any location in the world.

The programs presented and the classes taught at the facility have the potential "to imprint indelibly on the minds of students and faculty, the limitless grandeur and power of our Father in Heaven and his Son, Jesus Christ," Elder Scott said in a news release.

The BYU Astronomical Society runs the Friday night shows at the planetarium. The cost is \$2 per person, tickets go on sale at 6:30 and the shows are open to the public.

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## Important Dates & Events in the College

### Math SEMINARS & COLLOQUIA

Celestial Mechanics Seminar  
(MWF 10:00 AM; 294 TMCB)

Dynamical Systems Seminar  
(TTh, 10:00 AM, 297 TMCB)

Math Department Colloquium  
(T 4:00 PM in 1170 TMCB)

Number Theory Seminar  
(Th 4:00, 133 TMCB)

Probability Theory Seminar  
(MF 12:00, 297 TMCB)

Representation Theory Seminar  
(Th 3:00, 323 TMCB)

Stochastic PDE Seminar  
(MWF 1:00 PM, 112 TMCB)

System Identification Seminar  
(W 2:00 PM, 297 TMCB)

### Math Events

The **BYU Math Club** meets on  
Thursdays at 4:00 in 297 TMCB

#### **November 29, 2007**

(11:00 AM in 1170 TMCB)  
Brian Bethers of 1-800contacts will  
speak on how mathematics, statistics,  
and computer science have solved  
problems in his business.

#### **February 29, 2008**

Utah Conference on Undergraduate  
Research (UCUR) co-hosted by BYU  
and UVSC.

## Professor Chris Grant to Receive Distinguished Teaching Award in Mathematics



Professor  
Chris Grant  
will be  
awarded the  
third annual  
Distinguished  
Teaching  
Award in the

Brigham Young University  
Department of Mathematics  
on November 6, 2007 at 4  
PM. The award will be pre-  
sented in Room 1170 of the  
Talmage Building. Following  
the presentation, Professor  
Grant will deliver a public  
lecture on *Ernst Zermelo and  
the Ranking of Tournaments*.  
A reception will be hosted in  
the hallway next to the lec-  
ture room at 3:30 p.m.

The Distinguished Teaching  
Award for the BYU Depart-  
ment of Mathematics was  
established by a gift from  
Carolyn Savage Wright and  
the Kenneth C. Savage  
Foundation as a tribute to  
the many dedicated teachers  
in the BYU Department of  
Mathematics. The first two  
recipients of the award were

Stephen Humphries and  
Kening Lu. The stipend for  
the award is \$1,000. The  
recipient also receives (for  
the year) the sculpture *Wild-  
fire* by Helaman Ferguson, a  
former member of the BYU  
Department of Mathematics.  
The sculpture is a solid  
bronze wild sphere.

The award honors faculty  
who are widely recognized  
as extraordinarily successful  
in their teaching, have docu-  
mented teaching effective-  
ness, have a teaching influ-  
ence beyond their own  
classroom, foster curiosity  
about mathematics, and gen-  
erate excitement about  
mathematics in their stu-  
dents.

Professor Chris Grant has  
distinguished himself as a  
teacher of undergraduate  
mathematics and engineering  
students. He teaches  
courses required of mathe-  
matics and engineering ma-  
jors, who routinely find him  
to be their best math

teacher or even best teacher  
at Brigham Young University  
despite the fact that he  
teaches demanding and rig-  
orous classes. He has also  
been the mentor for eight  
Masters degree students.

Professor Grant's students  
find him extremely well or-  
ganized and appreciate him  
for grading both tests and  
assignments personally and  
quickly. His exams incorpo-  
rate a good mix of ways to  
evaluate students' learning.  
Professor Grant enjoys help-  
ing students during his office  
hours. His students view  
him as a very tough grader,  
but he is very consistent.  
Students know exactly what  
is expected. Although stu-  
dents find his courses chal-  
lenging, they also find them  
among their best experi-  
ences at BYU. His exem-  
plary teaching has been a  
model for two of his gradu-  
ate students who are now  
professors in departments of  
mathematics.

## John Lamb Given Maeser Teaching Award



John Lamb is a dedicated teacher and scholar, who is vig-  
orously innovative. He began using multi-media long be-  
fore there were "tech" rooms but never lets media inter-  
fere with his interaction with students; he developed the  
interactive CD ChemTutor; his student study groups influ-  
enced their adoption in introductory chemistry classes,  
and he is now developing learning modules. John has been  
an Alcuin Fellow, the Carnegie Foundation Utah Professor of the year, and  
he received a Student Honor Association certificate for incorporating gos-  
pel principles in teaching. John is a model of life-long learning. He estab-  
lished "Renaissance" luncheons for chemistry and has organized the GE  
Academy on Teaching and Learning. In class he makes frequent reference  
to literature, music, and art, and is himself a talented amateur artist.

# You can take it with you--mobile computing for the 21st Century

The pursuit of smaller and smaller electronic gadgets leaves one glaring problem: trying to perform work on those tiny screens.

For a solution, a Brigham Young University computer scientist developed an interactive projection system that synchronizes with a hand-held computer. The images projected onto a custom table from overhead will rotate and scroll in response to the touch of a hand.

Professor Dan Olsen and his students presented their work Oct. 12 in Rhode Island at TableTop 2007, a venue for ideas about moving computing away from the desktop. The conference is sponsored by the Institute of Electrical and Electronics Engineers, also known as IEEE.

"We're trying to push this idea of 'I can carry everything with me,'" Olsen said.

The system works by establishing a circuit through the table top, the user's body and into a conductive pad placed on the seat. The complete circuit is what makes it possible to scroll and rotate the screen.

The only modification to the handheld computer is a plate fastened on the back. The computer synchronizes with a ceiling projector aimed down at the table top.

Advantages of the system are quickly seen when Olsen's student assistants sit down to play an electronic version of the popular board game Risk. The playing surface, a map of the world, spills out across the table, covering roughly the same area as the physical version of the board game. One student reaches out and slides the projected map toward his corner to make a move, then rotates the map 180 degrees and pushes it back across the table to the other player.

"It's actually easier to play than the physical game because we can move it around and use it comfortably," Olsen said. "With the board game, we'd knock over all the pieces by moving the table."

The technology isn't all about fun and games, either. Olsen also uses spilling technology on spreadsheets and hopes the approach will make other applications like word processing feasible with handheld computers. Olsen's research goal is "Interactive computing everywhere."

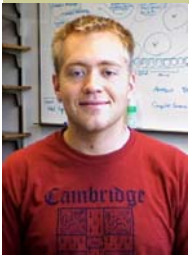
Olsen is a former director of the Human-Computer Interaction Institute at Carnegie Mellon University. He earned his Ph.D. from the University of Pennsylvania.

Watch a video demonstration here (<http://icie.cs.byu.edu/paperPDFs/TableTopSpillingSmallest.wmv>)



*Computer science professor Dan Olsen and his students recently demonstrated a system at a national gathering that synchronizes a handheld computer with a projected image of the computer's contents on a table. Touching the table rotates and scrolls the image.*

## IDEA Labs Undergraduate Initiates Exchange with Control Group at Cambridge University



Russ Howes, an undergraduate researcher in BYU's Information and Decision Algorithms Laboratories, or IDEA Labs for short, just returned from a five week visit to Cambridge University working with one of the world's premier research groups in control

systems. His work explores network reconstruction algorithms for biological systems. These procedures allow biologists to design the experiments needed to understand the complex mesh of protein signaling pathways in a cellular system.

As is typical for the research in IDEA Labs, Russ's project is extremely interdisciplinary. Russ, a mathematics major, is conducting this biology-focused research as part of his honor's thesis, advised by Professor Sean Warnick in the Computer Science Department. Professor Warnick spent last summer on sabbatical with the Control Group at Cambridge

University, and this visit initiated a research exchange between the groups that resulted in his return to Cambridge last winter semester and a visit to BYU by Cambridge's Professor Jorge Goncalves this last summer. Professors Warnick and Goncalves have been excited by the productivity between the groups, and they decided to initiate a student exchange. Russ was the first student to participate in this exchange, and Neil Dachau, a Ph.D. student at Cambridge, is scheduled to visit IDEA Labs this October, following a visit to Caltech.

"Besides the great research environment and the opportunities to meet so many leaders in the field," Russ explained, "I really felt at home in King's, with Family Home Evenings and activities with other BYU students." In fact, the mechanics of Russ's room and board arrangements with King's College were much easier than they might have been because of BYU's Professor Paul Kerry, who had already worked hard to make the necessary arrangements for the BYU honors summer studies program at Cambridge. "I am

very grateful to Paul for all his help supporting Russ," commented Warnick, "I met Paul while at Cambridge, and I really think he is an incredible asset for students at BYU."

"I am also grateful to all the people and organizations who have contributed financially to IDEA Labs, allowing us to create opportunities like this for students," said Warnick. Russ's research and visit was funded by a variety of sources, including the National Science Foundation, various Industrial Partners that work directly with IDEA Labs, and BYU's Honors Program and Office for Research and Creative Activities. Idea Labs is an interdisciplinary research group between Computer Science, Mathematics, Statistics and various other "decision focused" disciplines. Researchers in IDEA Labs explore processes for making effective decisions in complex and uncertain environments. The group is lead by Professors Warnick, in Computer Science, and Humpherys, in Mathematics; for more information visit [www.idea-labs.byu.edu](http://www.idea-labs.byu.edu).

## College Publications

### Chemistry & Biochemistry

R.B. Shirts, "Correcting Two Long-Standing Errors in Point Group Symmetry Character Tables," *J. Chem. Ed.*, 84(11), 1882-1884 (2007).

M.V. Lee, K.A. Nelson, L. Hutchins, H.A. Becerril, S.T. Cosby, J.C. Blood, D.R. Wheeler, R.C. Davis, A.T. Woolley, J.N. Harb, and M.R. Linford, "Nanografting of Silanes on Silicon Dioxide with Applications to DNA Localization and Copper Electroless Deposition," *Chem. Materials*, 19, 5052-5054 (2007).

L.D. Hansen, D.J. Russell, and C.T. Choma, "From Biochemistry to Physiology: The Calorimetry Connection," *Cell Biochem. Biophys.*, 49, 125-140 (2007).

F. Li and S.L. Castle, "Synthesis of the Acutumine Spirocycle via a Radical-Polar Crossover Reaction," *Org. Lett.*, 9(20) 4033-4036 (2007).

J.E. Patterson, Z.A. Dreger, and Y.M. Gupta, "Shock Wave-induced Phase Transition in RDX Single Crystals," *J. Phys. Chem. B*, 111, 10897-10904 (2007).

### Computer Science

David Cline, Kenric B. White, Parris Egbert, "Poisson Disk Point Sets by Hierarchical Dart Throwing", Symposium on Interactive Ray Tracing, pp. 129-132, Sept. 2007

David Cline, Kenric B. White, Parris K. Egbert, "Fast 8-Bit Median Filtering Based on Separability", International Conference on Image Processing (ICIP), pp. V281 – V284, Sept. 2007

Michael Jones, Mathew Beardall, McKay Farley, Darius Ouder Kirk, Jeremy Smith, Parris Egbert, "Goblins by Spheroidal Weathering", Eurographics Workshop on Natural Phenomena, 2007.

B. Morse, D. Thornton, Q. Xia, and J. Uibel, "Image-based color schemes," in IEEE International Conference on Image Processing, September 2007.

N. Toronto, B. Morse, D. Ventura, and K. Seppi, "The Hough transform's implicit Bayesian foundation," in IEEE International Conference on Image Processing, September 2007.

D. Hubbard, B. Morse, C. Theodore, M. Tischler, and T. McLain, "Performance evaluation of vision-based navigation and landing on a rotorcraft unmanned aerial vehicle," in WACV '07: Proceedings of the Eighth IEEE Workshop on Applications of Computer Vision, IEEE Computer Society, February 2007.

T. Arnold and B. S. Morse, "Interactive image repair with assisted structure and texture completion," in WACV '07: Proceedings of the Eighth IEEE Workshop on Applications of Computer Vision, IEEE Computer Society, February 2007.

### Geological Sciences

Greenhalgh, B., and Britt, B.B., 2007. Stratigraphy and sedimentology of the Morrison/Cedar Mountain formational boundary, east-central Utah. 2007. In, Willis, G.C., Hylland, M.D., Clark, D.L., and Chidsey, T.C., Jr., editors, Central Utah - diverse geology of a dynamic landscape. Utah Geological Association Publication 36: 81-100.

Kowallis, B.J., Greenhalgh, B.W., Sprinkel, D.A., Britt, B.B., 2007. New U-Pb zircon ages from an ash bed in the Brushy Basin Member of the Morrison Formation near Hanksville, Utah. In, Willis, G.C., Hylland, M.D., Clark, D.L., and Chidsey, T.C., Jr., editors, Central Utah - diverse geology of a dynamic landscape. Utah Geological Association. Publication 36: 75-80.

Johnson, K.H., and Griffen, D.T., 2007, Crystallographically oriented poly-phase rods in red willemite from Franklin, New Jersey. *The Canadian Mineralogist*, 45, 864-873.

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Greenhalgh, Brent W., Britt, Brooks B., "Stratigraphy and Sedimentology of the Morrison-Cedar Mountain Formation Boundary, East-Central Utah," *Central Utah-Diverse Geology of a Dynamic Landscape*, UGA Publication 36, p81, (2007).

Christiansen, Eric H., Baxter, Nichelle, Ward, Thomas P., Zobell, Elizabeth, Chandler, Matthew R., Dorais, Michael J., Kowallis, Bart J., Clark, Donald L., "Cenozoic Soldiers Pass Volcanic Field, Central Utah- Implications for the transition to Extension-related Magmatism in the Basin and Range Province," *Central Utah-Diverse Geology of a Dynamic Landscape*, UGA Publication 36, p123, (2007).

Soderblom, J., R. L. Kirk, J. I. Lunine, J. A. Anderson, K. H. Baines, J. W. Barnes, J. M. Barrett, R. H. Brown, B. J. Buratti, R. N. Clark, D. P. Cruikshank, C. Elachi, M. A. Janssen, R. Jaumann, E. Karkoschka, S. Le Mouelic, R. M. Lopes, R. D. Lorenz, T. B. McCord, P. D. Nicholson, J. Radebaugh, B. Rizk, C. Sotin, E. R. Stofan, T. L. Sucharski, M. G. Tomasko, and S. D. Wall 2007. Correlations between Cassini VIMS spectra and RADAR SAR images: Implications for Titan's surface composition and the character of the Huygens Probe landing site. *Planetary and Space Science* 55, 2025-2036.

## College Publications

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Eddleman, James L., Sorber, Samuel C., Morris, Thomas H., Grimshaw, Scott D., Dastrup, Emily, Christiansen, William F., Morris, Scott L., "Analysis of Fremont River Strath Terraces in the Area of the Capitol Reef National Park, Utah-Implications for Fluvial Landscape Evolution and the role of Climate Forcing," *Central Utah-Diverse Geology of a Dynamic Landscape*, UGA Publication 36, p181, (2007).

Dalrymple, Ashley, Morris, Thomas H., "Facies Analysis and Reservoir Characterization of Outcrop Analogs to the Navajo Sandstone in the Central Utah Thrust Belt Exploration Play," *Central Utah-Diverse Geology of a Dynamic Landscape*, UGA Publication 36, p311, (2007).

Hamaker, Sandra, Harris, Ron, "Fault-related Ground-water compartmentalization in the East Tintic Mining District, Utah," *Central Utah-Diverse Geology of a Dynamic Landscape*, UGA Publication 36, p405, (2007).

Sheeta, Rodney D., Britt, Brooks B., "Paleontological Discoveries of James A. "Dinosaur Jim" Jensen in Central Utah," *Central Utah-Diverse Geology of a Dynamic Landscape*, UGA Publication 36, p455, (2007).

Morris, Thomas H., Morgan, Craig D., Eckels, Marc T., Ritter, Scott M., Faatz, Renee Mauche, "Classic Geology and Reservoir Characterization Studies of Central Utah," *Central Utah-Diverse Geology of a Dynamic Landscape*, UGA Publication 36, p516, (2007).

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### **Mathematics**

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