

Newsletter

College of Physical and Mathematical Sciences

September 2006

IDeA lab receives \$700,000 grant from NSF

By Andrew Pete
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Getting Good IDeAs: The National Science Foundation announced last Wednesday that it would back a BYU Computer Science lab, the IDeA (Information and Decision Algorithm) Lab, which is directed by Computer Science professor Sean Warnick and Mathematics professor Jeffrey Humpherys, with a \$700,000 grant.

In collaboration with BYU's Computer Science, Mathematics, and Statistics Departments, IDeA Labs focuses on the application of Algorithmic Decision Processes to better understand methods for making decisions from data. However, the program is not limited to students of these majors, but instead encourages students to take their individual interests in combination with a mathematical background, creating a unique research practice.

This is where the rubber hits the road. And when there are bumps in the road, this is the place for answers and solutions.

That is the case of ATK Thiokol, a company that sought help in solving a difficult mathematical problem. It is also the case closer to home, when the BYU Bookstore needed assistance with the complexity of computer-programmed prices and sales. In each case, BYU's IDeA's labs solved it.

Known as "IDeA Labs," the Information and Decision Algorithm Laboratories recently won a \$700,000 grant from the National Science Foundation that will help the labs continue cutting-edge undergraduate research.

"Too often we build barriers between our fields when actually we're working on very similar problems," said Jeffrey Humpherys, assistant professor of mathematics and co-director of IDeA Labs. "These labs help students understand the mathematical and computational structures that are common in a

variety of disciplines," Humpherys said in an e-mail.

IDeA Labs is a collaboration between the computer science, mathematics and statistics departments that study Algorithmic Decision Processes. Whether in business, engineering or government, a decision process becomes algorithmic when it is made scientifically, or based on measurements or data.

The specific laboratories allow students to apply research techniques to a variety of problems in economics, finance, biology, business, manufacturing, engineering and government.

The labs allow both undergraduate and graduate students to work closely with professors in solving difficult Algorithmic Decision Processes for real clients. It is the merging of theory, research and application that caught the attention of the National Science Foundation.

"This is the best proposal I have read," noted one of the NSF panel reviewers who critiqued the proposal. Another reviewer noted that this program could "serve as a national model for integrating teaching and research at the undergraduate level."

The proposal placed first among 25 in its class that were submitted. "It is nice to get recognition from the National Science Foundation," said Sean Warnick, associate professor of computer science and co-director of IDeA Labs. "We are really excited about the work that we have been doing in IDeA Labs, and we are especially grateful to our supporters... and our other industrial partners that allowed us to build the proof of concept that captured NSF's attention."

IDeA Labs was formed by Warnick and Humpherys, who merged their research groups a year ago to develop this unique interdisciplinary mentoring environment.

For more information about these labs visit idealabs.byu.edu.

Drs. Jones and Ringger invited to Microsoft research conference

Two assistant professors in the Computer Science Department at Brigham Young University were invited to the Microsoft Research Faculty Summit 2006 at the Microsoft Conference Center in Redmond, Wash., in July.

Eric Ringger and Michael Jones attended the invitation-only conference, considered the premier gathering of academic researchers, teachers, Microsoft researchers, product group engineers and architects for in-depth presentations and discussions about computing problems and research trends. The theme this year was "Computing at the Center of Transformation."

As in years past, the conference brought just 350 academics from 175 leading institutions here and abroad to the summit.



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August External Grants awarded to Faculty

Department	Faculty	Project Title
Chemistry and Biochemistry	Steven Graves	Proteomics: A Novel Approach to Predicting Preeclampsia
Chemistry and Biochemistry	Matthew R. Linford	Research Collaboration with Sonic Innovations
Chemistry and Biochemistry	Reed M. Izatt, John Oscarson	Modeling and Thermodynamic Study

Center for Undergraduate Research in Mathematics

Recently, the Department of Mathematics was awarded a \$1.3 million grant from the National Science Foundation to establish at BYU the “Center for Mentoring Undergraduate Research in Mathematics.” This Center at BYU is currently the only such center in the U.S. The Center will promote undergraduate research projects in mathematics throughout the U.S. by: (1) training faculty members at BYU and other institutions as mentors for undergraduate research projects; (2) having these faculty members mentor undergraduate students in research groups

working together as a team on one research project during the academic year; (3) advising these faculty members on how to establish consistent funding to support undergraduate research at their own institution; and (4) preparing undergraduate students to succeed in graduate studies in mathematics. To help achieve these objectives, the Center will administer mini-grants each year to approximately 15 professors at various institutions across the U.S. (including BYU) and about 45 undergraduate students working on research during the academic year. Also, the partici-

pating professors will visit BYU during the summer to be trained in doing undergraduate research and the undergraduates will attend and present their research at an expanded College Spring Research Conference at BYU. The reviewers of the grant proposal were extremely impressed with the BYU Department of Mathematics’ record with undergraduate research and the quality of its undergraduate program. The BYU mathematics faculty members involved with the Center are Michael Dorff, Jeff Humpherys, Denise Halverson, and Tyler Jarvis.

Dr. Dan Olsen nominated for Utah Science Technology & Research



Dr. Dan Olsen was recently nominated by John Valentine, President of the Utah Senate, to sit on the State’s newly-created Utah Science Technology and Research (USTAR) Board. The Board will direct a new initiative that calls for the appropriation of 200 million dollars to aid

innovation and technology transfer at the State’s two major research universities, University of Utah and Utah State University. Research developed as a result of the funding will be licensed and used to produce new businesses.

Olsen says that technology transfer is one of the Governor’s primary focuses as it has the potential to expand generative industries in the state and attract top researchers. Development at these universities is expected to foster entrepreneurship and

benefit existing Utah industries.

Olsen has been a professor at BYU since 1985. He is an expert in human-robot interaction and has directed the Human Computer Interaction Institute at Carnegie Mellon. He received his B.S. and M.S. degrees in computer science from BYU and his Ph.D. in computer and information science from the University of Pennsylvania.

The bill outlining the board membership will be effective 1 July.

College Homecoming Activities

Chemistry Department

6:00 p.m. Reception
 6:30 p.m. Dinner
 7:30 p.m. Speaker – Professor Morris J. Robins
 “Curiosity-Based Research: A Productive Avenue for Biomedical Discovery”

Computer Science

Homecoming Reunion Activity
 Friday, Oct. 20th
 Courtyard of the JFSB

Geology

Thursday, Oct 19:
 8:00 - 5:00 - Field Trip to Covenant Oil Field
 Friday, Oct 20:
 8:00 - 5:00 - Field Trip to Little Cottonwood Canyon
 7:30 p.m. - Homecoming Spectacular

Saturday, Oct 21:
 8:00 a.m. - Alumni Breakfast - Garden Court
 ELWC

Physics and Astronomy

4-6 pm ESC Buffet Dinner
 4-7 pm ESC Reception and Student Research Displays
 5-6 pm ESC Planetarium Show
 6-7 pm ESC Physics Demonstration Show
 7:30 pm Marriott Center Homecoming Spectacular

Dr. Farnsworth to receive Lester Strock award

Paul Farnsworth will be receiving the Lester Strock award at the FACSS meeting in September. This is a national award that is sponsored by the New England Section of the Society for Applied Spectroscopy.

See <https://www.facss.org/contentmgr/showdetails.php/id/39>

Important Dates and Events in the College

October 2006

Tuesday, October 3

Math Seminar, Roger Baker, "Sum of Two Cubes" 10 AM 323 TMCB (For more info on math seminars/colloquia <https://math.byu.edu/Seminars/>)

Wednesday, October 4

Physics Colloquium, Gary Bowman, Northern Arizona University 4 PM C215 ESC

Thursday, October 5

Geology Claudio Scarpati - "The 79 AD Vesuvius Eruption and the Last Hours of the Polybius' Family at Pompeii" 11:00 C-295 ESC

Saturday, October 7

Math "2006 Fall AMW Western Section Meeting," University of Utah

Wednesday, October 11

Physics Colloquium, Peter Roming, Penn State 4 PM C215 ESC

Thursday, October 12

Geology Jiri Bruthans - "Salt karst in Iran" 11:00 C-295 ESC

Thursday, October 19

College Honored Alumni Speaker, Dallan Quass 11 AM 1170 TMCB

CS Colloquium, Yukihiro Matsumoto 11AM 1120 TMCB

Geology Eric Christiansen - "Igneous/Economic/Planetary" 11:00 C-295 ESC

Wednesday, October 25

Physics Colloquium, Vianey Villamizar, BYU 4 PM C215 ESC

Thursday, October 26

Geology Alan Mayo - "Hydrogeology" 11:00 C-295 ESC

New Faculty and Staff

Chemistry & Bio-chemistry

Kim Christensen
Young Wan Ham
Richard K. Watt

Computer Science

Kiersten Kariya

Geology

Jani Radebaugh

Math

Maria Nowak

Math Education

Doug Corey
Denise Daniels

Physics/Astronomy

Gus L. Hart

Kent Gee

Chair's Outstanding Paper Award

Upon recommendation of the Department of Statistics Scholarship and Award Committee the Chair's Outstanding Paper Award was presented to Gilbert W. Fellingham and H. Dennis Tolley, for their paper, "Comparing Credibility Estimates of Health Insurance Claims Costs," by Gilbert W. Fellingham, H. Dennis Tolley, and Thomas N. Herzog in the January 2005 issue of *The North American Actuarial Journal*. The Department Chair's Outstanding Paper Award recognizes outstanding contributions in Statistical Science.

Credibility methods are actuarial techniques of using data from insurance claims (experience) to estimate claims in the future. In this paper, the authors consider credibility methods applied to the complex realm of health insurance. A Bayesian hierarchical model is compared to the traditional linear mixed model in predicting 1995 health insurance claims costs from 1994 claims data. The Bayesian hierarchical model gives the actuary the ability to more flexibly specify likelihood structures that are appropriate for the data at hand, and the model facilitates the borrow-

ing of strength from various sources of data in order to yield better predictions for policyholder groups with small numbers of subjects and/or outliers.

Published since 1997, *The North American Actuarial Journal* is the premier publication of the Society of Actuaries. Serving the international, scientific, academic, business, and governmental communities, it is the most widely distributed actuarial journal.

College welcomes new employees in Dean's Office and Advisement Center

Carli Richards is the new student secretary in the Dean's Office. She is a Senior majoring in Business from Mukilteo, Washington.

Mary Ferguson is the new Student Advisor in the Advisement Center. She is a Junior majoring in English from Laguna Niguel, California.

ASA/JSM in Seattle, Washington

The American Statistical Association held their Joint Statistical Meeting in Seattle, Washington on August 6-10, 2006. More than half of the BYU statistics faculty attended and five faculty members made presentations. Our group hosted a very successful early morning breakfast that was attended by other LDS statisticians and student alumni. At the meeting Dr. Gilbert W. Fellingham received the "Statistics in Sports Award" for his contributions to the statistics in sports community with special recognition for applying innovative statistical solutions to real sports applications. The ASA/JSM meeting will be held in Salt Lake City in 2007.

Y professor's multimedia text enjoys Japanese translation, new edition

John D. Lamb, a professor in the Department of Chemistry and Biochemistry and associate dean for general education in the Office of Undergraduate Education at Brigham Young University, was recently invited to give a presentation about the second edition of his award-winning multimedia text, "Click Chemistry," at Osaka City University in Japan.

This English CD version of the text, "ChemTutor," was produced in the mid-1990s, and Lamb has been using it to teach introductory chemistry classes

ever since.

One of Lamb's research colleagues, Hiroshi Tsukube at Osaka City University, was impressed by Lamb's text, and subsequently translated the digital tutorial manual into a printed Japanese text, which is designed to accompany the English-based CD, to use with his own students.

A second edition, "ChemTutor II" which will also likely be translated into Japanese, contains more multimedia elements, including video and Flash animations. The new

edition's 20-minute mini-lectures, written in Flash and played in a Web browser, are easily navigable and much richer in multimedia than the original "ChemTutor," according to Lamb.



Chemistry

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R.M. Izatt and J.L. Oscarson, "Calorimetry: An Important Tool in Scientific Investigations," *Presented at the Second International Symposium on Calorimetry and Chemical Thermodynamics*, (April 2006).

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Geological Sciences

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Mathematics

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Mathematics Education

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Physics and Astronomy

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Michael D. Jones and Benjamin J. Taylor, C. David Laney and Francois van Wyk, "Homogeneous Photometry for the Hyades: Scale-Factor and Zero-Point Tests of Previously Published *BV (R)Ic* Photometry," *The Astronomical Journal*, 132:111-116, 2006 July.

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