

Newsletter

College of Physical and Mathematical Sciences

February 2008



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IDeA Labs Sends Two Students to the 46th Annual IEEE Conference

Sam Weyerman, a Ph.D. student, and Russell Howes, an undergraduate student, recently attended and presented at the 46th Annual IEEE Conference on Decision and Control (CDC). Sam and Russ are both currently members of IDeA Labs here at BYU. The conference, sponsored by IEEE (Institute of Electrical and Electronics Engineers, Inc.), SIAM (Society for Industrial and Applied Mathematics), and INFORMS (Institute for Operations Research and the Management Sciences), was held in New Orleans, LA from 12-14 December 2007.

Sam Weyerman presented his paper "Monotonically Improving Error Bounds for a Sequence of Approximations for Makespan Minimization of Batch Manufacturing Systems" at the conference. This work, done in collaboration with his advisor, Dr. Sean Warnick, presents analysis on a sequence of approximations for a class of dynamic programming problems. They showed that the error due to the approximation is bounded and that these bounds monotonically improve as the approximation approaches the exact problem. This result allows decision makers to choose a level of approximation, and hence an amount of necessary computation to achieve a solution, with a guarantee of how good the solution will be.



Russell Howes and advisor Dr. Sean Warnick presented their paper "Dynamical Structure Functions for the Reverse Engineering of LTI Networks" in the main poster session. Their work, in collaboration with Dr. Jorge Gonçalves of Cambridge University, develops a method to represent the network structure of linear, time-invariant (LTI) systems. Dynamical structure functions contain information about both structure and dynamics of a system. This way of looking at network structure is especially useful in applications such as biochemical networks. Their main result uses dynamical structure to precisely characterize the additional information required to obtain network structure from the transfer function (input-output data) of the system.

IDeA Labs is led by directors Jeffrey Humpherys and Sean Warnick, both professors here at BYU. IDeA Labs is an acronym for Information and Decision Algorithms Laboratories. The labs house an interdisciplinary research program dedicated to a computational mathematics education for students who are well rounded technical problem solvers. The program centers around the research application of Algorithmic Decision Processes, the study of the dynamics of systems that process data in making decisions. More information about current projects can be found online at idealabs.byu.edu.

Important Dates & Events in the College

February 2008

Mathematics

March 14, 2008 - Pi Day Celebration!
Meet at Brigham Square on BYU campus at 1:59 PM for awesome games, prizes and food.

March 14, 2008 - 2008 Integration Bee, 3:30-6:30 PM in the BYU Math Lab (159 TMCB).

CURM Conference and MAA Intermountain Section Meeting
March 14-15, 2008 - 2008, Provo, UT
<http://math.byu.edu/curm/2008conference/>

REMINDERS!!!

Don't forget that Spring Research Conference is held this year in the Jesse Knight Building. The General Session will be in room 1102.

Spring Research Conference

The 22nd Annual Spring Research Conference will be held on Saturday March 15, 2008 from 8am –2pm

A Free Continental Breakfast Will be Served

College Publications

Chemistry & BioChemistry

Merritt B. Andrus and Zhifeng Ye, APhase-transfer catalyzed glycolate conjugate addition, *Science Direct*, **49**, 10.1016 (2007).

X. Sun, P.B. Farnsworth, A.T. Woolley, H.D. Tolley, K.F. Warnick and M.L. Lee, APoly(ethylene glycol)-Functionalized Devices for Electric Field gradient Focusing, *anal. Chem.*, **80**, 451-460 (2008).

Morris J. Robbins, Ireneusz Nowalk, Viven K. Rajwanshi, Karl Miranda, John F. Cannon, Matt A. Peterson, Graciea Amdrea, Robert Snoeck, Erik De Clercq, and Jan Balazrini. "Synthesis and Antiviral Evaluation of 6-(Alkyl-heteroaryl)furo[2,3-d] pyrimidin-2(3H)-one Nucleosides and Analogues with Ethynyl, Ethenyl, and Ethyl Spacers at C6 of the Furopyrimidine Core" *J.Med Chem*, **50**, 3897-3905 (2007).

Deborah G. Mitchell, Alan M. Johnson, Jeremy A. Johnson, Kortney A. Judd, Kilyoung Kim, Maurine Mayhew, Amber L. Powell, and Eric T. Sevy. "Collisional Relaxation of the Three Vibrationally Excited Difluorobenzene Isomers by Collisions with CO₂: Effect of Donor Vibrational Mode. *J.Phys.Chem A* **112**, 1157-1167 (2008).

Jeremy A. Johnson, Andrew M. Duffin, Brian J. Hom, Karl E. Jackson and Eric T. Sevy. "Quenching of Highly vibrationally excited pyrimidine by collisions with CO₂. *The Journal Of Chemical Physics*, **128**, 054304-1

Weili Yu, Lee D. Hansen, Wenying Fan, Wenyi Zhao and E. Durant McArthur, Adaptation of Growth and Respiration of Three Varieties of Caragana to Environmental Temperature *Asian Journal of Plant Sciences* **7**, 67-72 (2008).

X.Sun, J.Liu and M.L.Lee. "Surface Modification of Glycidyl-containing Poly (methyl methacrylate) Microchips Using Surface-initiated Atom Transfer Radical Polymerization, *Anal. Chem.*, **80**, 856-863.

D.Maynes, J.Tenny, B.W. Webb and M.L.Lee. "Influence of Varying Electroosmotic Flow on the Effective Diffusion in Electric Field Gradient Separations", *Electrophoresis*, **29**, 549-560.

Computer Science

Jorge Goncalves, Russell Howes, and Sean Warnick, "Dynamical Structure Functions for the Reverses Engineering of LTI Networks," *IEEE Conference on Decision and Control*, New Orleans, LA, December 2007.

W. Weyerman, and S. Warnick, "Monotonically Improving Error Bounds for a Sequence of Approximations for Makespan Minimization of Batch Manufacturing Systems," *IEEE Conference on Decision and Control*, New Orleans, LA, December 2007.

Smith, M., Giraud-Carrier, C. and Judkins, B. (2007). Implicit Affinity Networks. In *Proceedings of the Seventeenth Annual Workshop on Information Technologies and Systems*, 1-6.

Geological Sciences

J. Keith Rigby, David M. Rohr, Robert B. Blodgett, and Brooks B. Britt, 2008. Silurian sponges and some associated fossils from the Heceta Limestone, Prince of Wales Island, southeastern Alaska. *Journal of Paleontology*. **82**, p. 91-101.

Mathematics

Physics and Astronomy

Statistics

Page, G.L., Fellingham, G.W. and Reese, C.S. "Using Box-Scores to Determine a Position's Contribution to Winning Basketball Games." *The Journal of Quantitative Analysis in Sports*, **3**(4), Article 1, 2007

Vehrs, P.R., Keller, D.M., George, J.D., Hager, R.L., and Fellingham, G.W. "Monitoring changes in VO₂ max during 14 weeks of endurance training using the cardio coachR", *Journal of Strength and Conditioning Research*, **21**(1):62-66, 2007.

Vehrs, P.R., George, J.D., Fellingham, G.W., Plowman, S.A., and Dustin-Allen, K. "A submaximal treadmill exercise test to predict VO₂ max in fit adults". *Measurement in Physical Education and Exercise Science*, **11**(2):61-72, 2007.

Rencher, A.C., and Schaalje, G.B. *Linear Models in Statistics*. 2nd Edition. Hoboken: John Wiley & Sons, Inc. 2007.

Christensen WE, and Florence LW, "Predicting presidential and other multistage election outcomes using state-level pre-election polls," *The American Statistician*, **62**, 1-10, (2008).