

Dear Friends of Physics and Astronomy,

With the 2010-11 academic year in full swing, the department is entering into an exciting new chapter. We started the fall quarter with 3 new faculty: Jens Koch (Condensed Matter Physics), Frank Petriello (High Energy Physics), Andrew Smith (Lecturer). Also, we wish to recognize Yoram Lithwick (Astrophysics), who joined us last January. This year we are actively searching for Assistant Professors in experimental High Energy Physics and in Optical Condensed Matter Physics. If you know of interesting candidates, please send us your recommendations.

We have 13 first-year graduate students joining us from the University of Science and Technology of China, University of California - Santa Barbara, Yerevani Petakan Hamalsaran, Wheaton College, The University of Auckland, University of Illinois - Urbana, Oxford University, Engineering School of Shiraz University, Reed College, National Taiwan University, the University of Florida, Tsinghua University, and the Harbin Institute of Technology.

The rumblings of construction to build a fourth floor addition above the F-wing at the Technological Institute and a new clean room facility between F- and G-wings are a constant distraction.

I wish to thank Venkat Chandrasekhar for his three years of service as Chair for the department. Several exciting programs were born under his leadership, and continue to thrive today, most notably the Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA) and a new interdisciplinary graduate program in Applied Physics.

This special issue of Dimensions is dedicated to our graduate alumni, and highlights the achievements of a handful. If we've missed you, please send us an update for next year's edition. We are proud of our alumni, and want to hear how you're doing.

Warmest wishes,

Heidi Schellman, Professor and Chair
Department of Physics & Astronomy

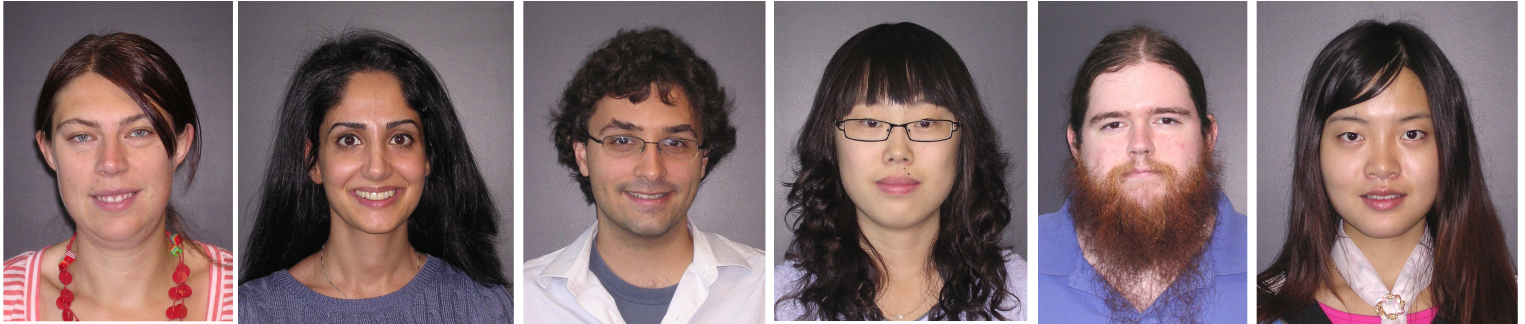
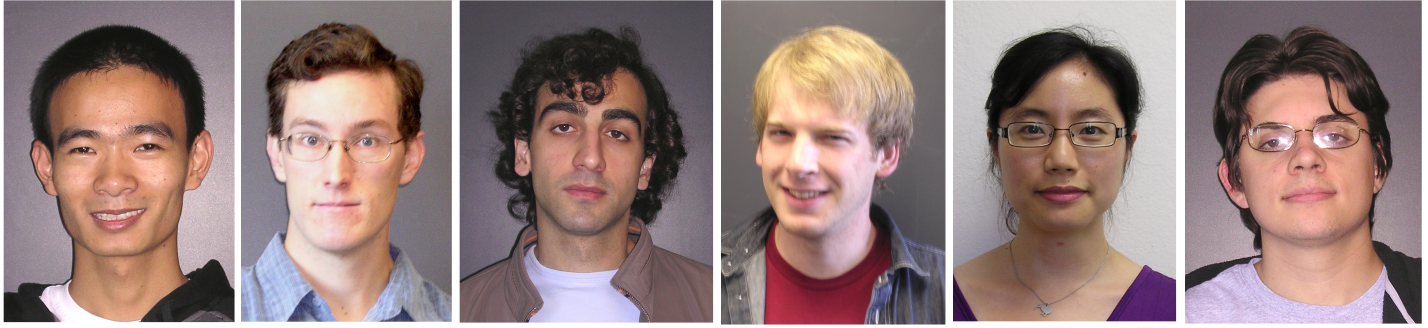
Please visit the Physics and Astronomy website for a complete list of upcoming events: www.physics.northwestern.edu/events



Be sure to check out our Facebook Fan page and our Linked in Group page.
Type in "Department of Physics and Astronomy, Northwestern University".



Welcome to our Incoming Graduate Students!



Row 1: Miaoqi Chu - *University of Science and Technology of China*, Rory Hartong-Redden - *University of California Santa Barbara*, Boris Harutyunyan - *Yerevani Petakan Hamalsaran*, Erik Lenferink - *Wheaton College*. Rachel Mak - *The University of Auckland*, Nicholas Mucia - *University of Illinois, Urbana*

Row 2: Cheryl Patrick - *Magdalen College*, Sara Rastegar - *Engineering School of Shiraz University*, Carl Rodriguez - *Reed College*, Yuzhu Sun - *Harbin Institute of Technology*, Joshua Wiman - *University of Florida*, Yang Yang - *Tsinghua University* **Not Pictured:** Ming-Feng Tu - *National Taiwan University*

We Hear That . . . (Alumni News)

Shireen Adenwalla (PhD 1989, Advisor: John Ketterson), is an Associate Professor at the University of Nebraska - Lincoln.

Tim Andeen (PhD 2008, Advisor: Heidi Schellman) is moving to Columbia University to work as a Research Associate after spending two years at CERN as a CERN Fellow.

Eileen Berman (BS 1980, MS 1982), continues to work as a member of the Computing Division at Fermi National Accelerator Laboratory. This work enables her to help Astrophysics and High Energy Physics Experiments with the infrastructure they need to run their experiment, and take and analyze their data. She has also just started as the Long Baseline Neutrino Experiment (LBNE) Project Computing Coordinator. As part of this role, she is beginning to understand and help with the many layers of computing involved in bringing

an experiment to life. She has had experience at the beginning of experiment projects before (The Sloan Digital Sky Survey) and it is an exciting place to be!

Sabyasachi Bhattacharya (PhD 1978, Advisor: John Ketterson) is a Professor at the Tata Institute of Fundamental Research, Mumbai, India.

Alex Bogacz (PhD 1986, Advisor: John Ketterson), is a Staff Scientist for the Center for Advanced Studies of Accelerators at the Thomas Jefferson National Accelerator Facility in Newport News, VA.

Sunglae Cho (PhD 1997, Advisor: John Ketterson), is an Associate Professor at the University of Ulsan, Ulsan, South Korea.

Dan Claes (PhD 1991, Advisor: Bruno Gobbi) is now department chair at the University of Nebraska, Lincoln and they just opened a new building:
<http://www.newsnetnebraska.org/nnn/jorgensen-hall-debuts-on-unl-campus/>

George W. Crabtree (PhD 1974, Advisor: John Ketterson) is currently working as a Senior Physicist, Argonne National Laboratory, Argonne, IL.

Anne Dabrowski (PhD 2006, Advisor: Mayda Velasco) is finishing her CERN fellowship. By the end of 2010 will become a lecturer on Accelerator Physics and Instrumentation at Ecole Polytechnique Federale de Lausanne (EPFL) this fall. Anne will continue her research work on novel instrumentation development as a Senior Scientist at Royal Holloway, University of London (RHUL).

John Davis (PhD 2008, Advisor: Bill Halperin) was recently appointed Assistant Professor at the University of Alberta - Edmonton. He says he is excited by the opportunity to continue working on cool problems in ultra-low-temperature physics and nanomechanics.

Jonghwa Eom (PhD 1998, Advisor: Venkat Chandrasekhar) is working as a Professor at Sejong University in Seoul, South Korea.

Allan D. Feinerman (PhD 1987, Advisor: John Ketterson), is an Associate Professor at the University of Illinois at Chicago and a Visiting Scholar at Northwestern University.

Teresa Fonseca (PhD 2005, Advisor: Mayda Velasco) has a new position at the Albert Einstein Center for Fundamental Physics at University of Bern, Switzerland. Teresa has become the trigger coordinator for SUSY searches for the ATLAS experiment at the LHC.

Tassos Fragos (PhD 2010, Advisor: Prof. Vicky Kalogera) is now working at the Harvard-Smithsonian Center for Astrophysics, sponsored by two postdoctoral fellowships joint for 4 years: one from the Harvard Institute for Theory and Computation (ITC) and one from the Smithsonian CfA.

Atakan Gürkan (PhD. 2005, Advisor: Fred Rasio) was awarded a Veni Fellowship at Leiden Observatory (awarded by the Dutch National Science Foundation).

John Hewitt (PhD. 2009, Advisor: Farhad Yusef-Zadeh) is currently working an NRC postdoctoral fellow at NASA's Goddard Space Flight Center.

Chunglee Kim (PhD 2006, Advisor: Vicky Kalogera) is now a Postdoctoral Fellow at West Virginia University.

Jeffrey Klug (PhD 2010, Advisor: Prof. Michael Bedzyk) is now part of a collaboration that recently published the following article: "Effects of Cantilever Buckling on Vector Piezoresponse Force Microscopy Imaging of Ferroelectric Domains in BiFeO₃ Nanostructures", Ramesh Nath, Seungbum Hong, Jeffrey A. Klug, Alexandra Imre, Michael J. Bedzyk, Ram S. Katiyar, and Orlando Auciello, Applied Physics Letters, 96, 163101 (2010). Systematic studies are presented on the effects of cantilever buckling in vector piezoresponse force microscopy V-PFM imaging of polarization domains in thin-film-based 001-oriented BiFeO₃ nanostructures, as observed through the coupling of out-of-plane and in-plane PFM images. This effect is a strong function of the laser spot position on the cantilever, being strongest at the free end, and insignificant at 60% of the cantilever length from the pivot point. This finding provides a unique approach to V-PFM imaging of ferroelectric polarization domains, yielding three dimensional PFM images without sample rotation in the plane.



Aerial view of Technological Institute, built in 1942.

Yoonseok Lee received his PhD from Northwestern in 1997 in the Ultra-Low- Temperature Laboratory of Professor Bill Halperin. Yoonseok was the lead researcher and author on an experiment that demonstrated a unique form of spontaneous symmetry breaking associated with the superfluid phases of liquid helium three - dubbed by Nobel Laureate Tony Leggett as “broken relative spin-orbit symmetry”. Yoonseok’s thesis experiment detected the asymmetry in the velocity of right- and left-circularly polarized currents of superfluid helium three as these currents propagate along the direction of an applied magnetic field. By explicitly breaking time-reversal symmetry using the applied field, Yoonseok and co-workers were able to expose the subtle, but defining, broken spin-orbit symmetry associated with the superfluid phase of helium three. After Northwestern, Yoonseok spent two years at Stanford as a post-doctoral fellow in Doug Osheroff’s laboratory. Professor Lee now heads an internationally recognized ultra-low temperature research laboratory at the University of Florida devoted to studying acoustic and magnetic properties of quantum liquids and solids as well as transport of charge and heat in low-dimensional quantum conductors. In addition to physics, Professor Lee is a passionate supporter of sports, classical music, and teaching at all levels. Professor Lee has been recognized for his contributions to both teaching and research. He is an Alfred P. Sloan Fellow, and NSF Career Awardee, College of Letters, Arts and Sciences Advisor of the Year (2006) and Physics Department Teacher of the Year (2004) at the University of Florida.

Casey Law (PhD 2007, Advisor: Farhad Yusef-Zadeh) has recently joined the UC Berkeley Department of Astronomy as a Postdoctoral Fellow. Casey was previously at the University of Amsterdam.

Anita Madan (PhD 1997, Advisor: John Ketterson), is an Advisory Engineer for IBM, Microelectronics Division in East Fishkill, NY

Mark Meisel (BA 1980, PhD 1983, Advisor: Bill Halperin) will be awarded an honorary doctorate (Doctor Honoris Causa) by the Scientific Board of Pavol Jozef Šafárik University in Košice, Slovakia, on November 12, 2010. Mark is currently a Professor at the University of Florida - Gainesville.

Kenjiro Miyano (PhD 1975, Advisor: John Ketterson) is the Director, Research Center for Advanced Science and Technology, University of Tokyo, Tokyo, Japan

André Moreau (PhD 1991, Advisor: John Ketterson) and wife Stella Yong report that their oldest son will enter the Materials Science department at McGill University next year . . . André has worked at the Industrial Materials Institute in Boucherville (near Montreal, Quebec) for nearly 20 years, developing optical and ultrasonic sensors to measure the microstructure and properties of materials.

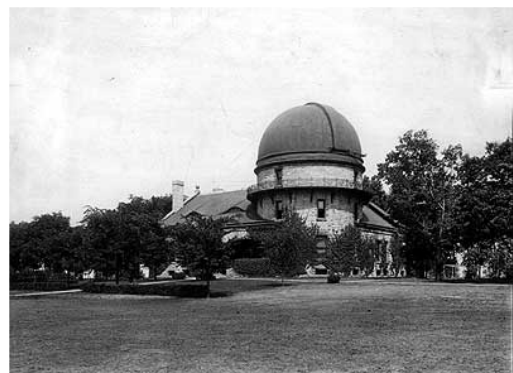
Christie S. Nelson (PhD 1999, Advisor: John Ketterson) is a Physicist for the National Synchrotron Light Source at Brookhaven National Laboratory in New York, Upton, NY

Yongsup Park (PhD 1994, Advisor: John Ketterson) is a Professor, Kyung Hee University in Seoul, Korea

Krishnaswamy Raghunathan (PhD 1978, Advisor: Ralph Segel) - Dr. Raghunathan worked in the aerospace industry following his graduation and has also worked on meteorological satellites as well as geo-synchronous communication satellites. Although he retired from full-time employment in 2006, he is still working part-time at Space Systems/LORAL as a staff assistant to the Chief Engineer.

Emmanouela Rantsiou (PhD. 2009, Advisor: Fred Rasio) has started a postdoctoral position in the Department of Astrophysical Sciences at Princeton University in October.

Bimal K. Sarma (PhD 1980, Advisor: John Ketterson), is a Professor at the University of Wisconsin-Milwaukee



Dearborn Observatory, 1938

Joseph A. Schaefer (PhD 1972, Advisor: Jules A. Marcus) - From 1971 through 1999 Dr. Schaefer taught Physics and Engineering at Loras College in Dubuque Iowa, reaching the rank of Professor of Physics and Engineering Science. In the fall of 1999 he left Loras College, and began teaching in the Department of Aerospace Engineering at Iowa State University in Ames, Iowa, where he has the rank of Senior Lecturer. Currently, his primary teaching is the introductory course in Fluid Mechanics and the Strength of Materials laboratory course. He holds the title of Professor Emeritus at Loras College. In 1989, he was recognized by the Council for Advancement and Support of Education as the "1989 Iowa Professor of the Year." In 2008 the Loras College Alumni Association selected him for recognition for Outstanding Contributions by an Alumnus to Teaching at Loras College. His most recent research activities involve freeze-bonding of ice and the physics of ice jams, conducted at the Iowa Institute of Hydraulic Research at the University of Iowa.

Ivan K. Schuller (PhD 1976, Advisor: John Ketterson), is a Professor at the Department of Physics, UC San Diego, San Diego, CA

Micheol Shin (PhD 1992, Advisor: Anupam Garg) is an Associate Professor at the Korea Advanced Institute of Science and Technology in Daejeon, S. Korea

Bellave S. Shivaram (PhD 1984, Advisor: John Ketterson), is an Associate Professor for the Department of Physics at the University of Virginia

Genya Takeda (PhD 2008, Advisor: Fred Rasio) has accepted a position as Manager of Research & Development at Sanoh Industrial, Ltd, in Tokyo, Japan. Sanoh Industrial is primarily a specialty manufacturer of automobile parts.

Christopher D. Thomas (PhD 1997, Advisor: John Ketterson), is the High-k Deposition Group Leader for Intel Corporation in Hillsboro, OR

Thomas S. Toellner (PhD 1996, Advisor: John Ketterson), is a Physicist at Argonne National Laboratory Advanced Photon Source, Argonne, IL

Anton Vorontsov (PhD 2004, Advisor: Jim Sauls), who is currently an Assistant Professor at Montana State University in Bozeman, MT, has received an NSF Career Award, one of the NSF's most important ways of recognizing outstanding young faculty. The title of Anton's proposal was Theory and Modeling of Non-Uniform Superconductors and Superfluids. Anton has also been appointed a Faculty Scholar for 2010 - 2013 at the Kavli Institute for Theoretical Physics at UC - Santa Barbara.

Gang Wang (PhD 2003, Advisor: John Ketterson), was promoted to Associate Professor at Indiana-Purdue Univ, Fort Wayne, IN

Hong-Kuen Wong (PhD 1985, Advisor: John Ketterson), is a Professor at the Chinese University of Hong Kong

Sahal Yacoob's dissertation (PhD 2010, Advisor: Heidi Schellman) contains a value for the mass of the W boson which has not yet been released publicly, but which represents a substantial improvement on all previous measurements. The mass of the W boson is directly related to the Weinberg angle, one of the fundamental parameters of nature.

Geralyn "Sam" Zeller (B.A. 1994, PhD 2002, Advisor: Heidi Schellman) Sam Zeller accepted a position as an associate scientist at Fermilab last December. She continues to study neutrino interactions and oscillations as analysis coordinator for the MiniBooNE experiment. More recently, she has been working to advance the design for the Long-Baseline Neutrino Experiment (LBNE), a proposal to send an intense beam of neutrinos from Fermilab to the Deep Underground Science and Engineering Laboratory (DUSEL) in Lead, South Dakota.

Previously, Sam received the 2003 APS Tanaka Dissertation prize for her measurement of the Weinberg Angle.

Erhai Zhao (PhD 2005, Advisor: Jim Sauls), who is currently an Assistant Professor at George Mason University, was the Invited Speaker at the Symposium on Charge and Spin Transport in Superconducting/Ferromagnetic Josephson Devices at the 2010 March Meeting of the American Physical Society.

Peter Zweber (PhD 2006, Advisor: Kamal Seth) will be joining Arete Associates in Arlington, VA, as a Staff Scientist on June 1, 2010. Peter was formerly a Research Associate at the University of Minnesota, working on the particle physics experiments CLEO-c and BESIII. On November 25, 2008, Peter and his wife Adrienne welcomed the newest member of their family, a baby boy named Zoran Zweber.

2009-2010 PhD GRADUATES

Jonathan Andreasen, who worked with Prof. Hui Cao, is now a postdoc (with a Chateaubriand Fellowship) at the Université de Nice-Sophia Antipolis in Nice, France. His thesis was titled Numerical Studies of Lasing and Electromagnetic Fluctuations in Open Complex Systems.

Sourav Chatterjee, who worked with Prof. Fred Rasio, wrote his thesis: Numerical Modeling of Dense Star Clusters. He is now a Postdoctoral Fellow working on exoplanets at the University of Florida in Gainesville.

Tassos Fragos, worked with Prof. Vicky Kalogera on his thesis, Formation and Evolution of X-ray Binaries. He is now a 2010 ITC/CfA Postdoctoral fellow at Harvard-Smithsonian Center for Astrophysics

Nicholas B. Hatcher worked with Prof. Art Freeman on his thesis, Electronic and Phononic Origins of Martensitic Behavior in NiTi-based Binary and Ternary Shape Memory Alloys. He has accepted a postdoctoral position at the Interdisciplinary Centre for Advanced Materials Simulation (ICAMS), a new research centre at the Ruhr-Universität in Bochum, Germany.

John (aka Jack) Hewitt, who was also an undergraduate at Northwestern, completed his thesis, Supernova Remnant Masers: Shock Interactions with Molecular Clouds with Farhad Yusef-Zadeh. Jack is currently an NRC Post-Doctoral Fellow at NASA Goddard in Greenbelt, MD.

Gabriel Juarez has accepted a postdoc position with Prof. Paulo Arratia in the Mechanical Engineering and Applied Mechanics Department at the University of Pennsylvania. He wrote his thesis Mixing and Segregation Dynamics of Granular Materials in Rotating Tumblers under the joint supervision of Prof. Adilson Motter and Prof. Richard Lueptow (of Mechanical Engineering).

Jeffrey Alan Klug worked with Prof. Michael Bedzyk on his thesis Synchrotron X-ray Studies of Ferroelectric Thin Films and Nanostructures. He is now a postdoc at Argonne National Laboratory.

Heeso Noh worked with Prof. Hui Cao on his thesis, Optical Properties of Nanostructures, from Random to Periodic. He is now a postdoctoral fellow at Yale University.

Luis Mier y Teran Romero wrote his thesis, Reduction of Mechanistic Models of Protein Translation and mRNA Degradation: Applications to Gene Regulatory Circuits with Prof. Sara Solla and Prof. Mary Silber (Applied Math). He has accepted a postdoc at Johns Hopkins to work on the mathematical modeling of epidemiology.

Mary Salit's thesis advisor was Prof. Selim Shahriar. Her thesis was titled Intracavity Fast Light for Rotation Sensing and Gravitational Wave Detection. She is now working as a scientist for Honeywell, Inc. in Plymouth, Minnesota.

Jeremy Sepinsky worked with Vicky Kalogera on his thesis, Orbital Evolution of Eccentric Interacting Binary Systems. has been promoted from Lecturer to Assistant Professor at the University of Scranton. Jeremy began teaching at Scranton last year, shortly after receiving his PhD in June, 2009.

See www.physics.northwestern.edu/graduate/alumni.html for more information.

Michael Stringer worked with Prof. Luis Amaral (Chemical Engineering) and Prof. Adilson Motter to write his thesis, A Complex Systems Approach to Biometrics. He is now a Fellow in the Kellogg School of Management, and a Managing Partner for Datascope Analytics, LLC.

Sahal Yacoob wrote his thesis, Measurement of the W Boson Mass in Proton-Antiproton Collisions at a Center of Mass Energy of 1.96 TeV, with Heidi Schellman. He is a postdoc for the University of Wittwatersrand (South Africa) but will be based at CERN in Switzerland.

They may not be living in Switzerland (on a year-round basis), but nonetheless an astonishing number of Northwestern graduates are working at CERN on the newly opened Large Hadron Collider, mostly with the CMS and ATLAS detectors. The ones we know about include:

CMS

Derek Barge (MS 2006)

Dan Claes (PhD 1991, Bruno Gobbi)

Lucien Cremaldi (PhD 1983, Jerome Rosen)

Silvia Goy-Lopez (MS 2003)

Paolo Rumerio (PhD 2003, Jerome Rosen)

Robert Snihur (PhD 2000, Heidi Schellman)

Derek Strom (PhD 2009, David Buchholz)

Mayda Velasco (PhD 1995, Ralph Segel)

ATLAS

Tim Andeen (PhD 2008, David Buchholz)

Teresa Fonseca-Martin (PhD 2005, Mayda Velasco)

David Joffe (PhD 2004, Kamal Seth)

Muge Karagoz-Unel (PhD 2004, Michael Schmitt)

Tom LeCompte (PhD 1992, Jerome Rosen)

Fred Luehring (PhD 1986, Don Miller)

Srini Rajagopalan (PhD 1992, David Buchholz)

Sahal Yacoob (PhD 2010, Heidi Schellman)

Rik Yoshida (PhD 1990, Jerome Rosen)

LHCb

Marina Artuso (PhD 1986, Kamal Seth)

Staff News

Current Staff

Raymond Bailey, Undergraduate Program Assistant

Robert Buntin, Undergraduate Laboratory Assistant

Marsha Coffey, Physics & Astronomy Business Administrator

Grant Darktower, Graduate Secretary

Vicki Eckstein, Accounting Assistant

Pam Horstmann, Department Assistant

Agnes Kieca, Financial Assistant

Carrie Middleton, Dearborn Program Assistant

Bob Tilden, Computer Specialist, Particle Physics Group

Emily Updegraff, Assistant Chair for Administration

Former Staff (Where are they now?)

Anne Colilla is a Financial Assistant for the Allen Center at Northwestern University

Ves Brumfield is a Student Financial Service Representative 2 for the Student Accounts Office - Chicago Campus at Northwestern University



Yvette Davis is the Business Administrator for the Life Sciences Financial Services Office at Northwestern University

Christian Lopes is a Facilities Assistant for the Department of Chemistry Administration at Northwestern University



Jean Shedd is the Associate Provost at Northwestern University

Ann Wheatley is the Business Administrator for the Department of Chemistry Business Office at Northwestern University

Technological Institute Construction Update!



The beams outlining the frame of the new fourth floor of the F-Wing are almost in place.



Photos by Bob Tilden

Concrete pillars of the new addition rise from the ground.

The department newsletter is a means of reaching out to the alumni to keep them abreast of current research and developments in the Department of Physics and Astronomy. It is also a forum for alumni to keep the department informed of their accomplishments; the department welcomes submissions from alumni of newsworthy items for publication in the newsletter. Please feel free to email your achievements to Raymond Bailey at rgb@northwestern.edu.