



newsletter

Ray W. Herrick Laboratories

Purdue University, West Lafayette, IN 47907-2031

<https://engineering.purdue.edu/Herrick>

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NIST Funds Approved for Herrick Building Project

Friday, January 8th was an exciting day at the Herrick Laboratories. The National Institute of Standards and Technology (NIST) announced that it is granting approximately \$11.8 million for the proposed Center for High Performance Buildings at the Herrick Laboratories. This funding announcement means that NIST is doubling the funds already raised from private donors. This grant was only possible because of the \$11.75m donated by alumni, industry, and friends of the Herrick Laboratories Building Campaign that was used to leverage the grant.

NIST awarded \$123m to support the construction of new scientific research facilities at 11 universities and one non-profit research organization. The one-time grants, range from \$1.4 million to \$15 million dollar. The awards, funded under the American Recovery and Reinvestment Act, are for buildings that support research to advance measurement science in six areas of critical national importance, including environment & climate change, energy, information technology & cyber security, bioscience & health care, and manufacturing & physical infrastructure.

“With these grants, we are leveraging our nation’s brightest minds in measurement science to address important national needs,” said NIST Director Patrick Gallagher. “These projects will bolster U.S. scientific and technological infrastructure, increasing our nation’s ability to innovate, compete, and solve scientific and technological problems.” For information on the awards, see: www.nist.gov/public_affairs/releases/20100108_cgp_awards.htm

A special feature of the new Herrick facility will be the “Living Laboratory,” a working office wing designed with replaceable, modular elements such as communications, controls, equipment and façade; a reconfigurable air distribution

and lighting system; and instrumentation to monitor systems and occupants. Researchers will be able to use the Living Laboratory to test and validate new building systems and concepts. Similarly, a new Perception-Based Engineering laboratory will be able to simulate a wide span of building environments. Lighting, acoustic environment, air quality, temperature, humidity, air flow and vibration will all be controlled independently. At the same time, existing Herrick Laboratories facilities, such as the advanced engines test area will be replaced and expanded.

Leah Jamieson, Purdue’s John A. Edwardson Dean of Engineering commented, “The research will attack some of the most daunting and complex problems confronting the world, such as rising energy consumption and environmental pollution, climate change, public health, comfort and security, and issues associated with an aging population.”

The principal investigators on the proposal are Herrick Professors; Jim Braun, Yan Chen, and Patricia Davies; Robert Olson from Office of the University Architect; and Dan Hirleman, Head of Mechanical Engineering, but there were many people involved in putting the proposal together including Dave Sereno and other architects and building specialists from AEI; John Sanderson, Director of Development in Mechanical Engineering; and Larry Fusaro the University Architect and Diane Windler of the University Architect’s Office.

The Purdue project will begin in February 2010 and is projected to be completed by December 2012. This represents two-thirds of the whole Herrick Laboratories replacement and expansion plans so fund raising continues. We still need to furnish and

equip this phase and raise funds for the final phase. No donation is too small, and we hope that you’ll be able to participate in some way. For more information, please contact John Sanderson at (765) 494-9769 or sanderjd@purdue.edu.

Important Dates for the

20th International Compressor Engineering, 13th International Refrigeration and Air Conditioning, and 1st International High Performance Buildings Conferences



April 16, 2010: Manuscripts due

May 12, 2010: Notification of acceptance or rejection of manuscripts

May 31, 2010: The presenting author must be registered and the final version of the paper must be uploaded or the Final Paper **WILL NOT BE** published

July 10-11, 2010: Short courses

- Introduction to Compressors
- Supermarket Refrigeration
- High Performance Buildings

July 12-17, 2010: Conferences take place at the Stewart Center on the Purdue Campus.

More information: on the website: <https://engineering.purdue.edu/Herrick/Events/2010conf>

Some New Classes Taught by Herrick Professors

Sustainable Energy Class

A new course was offered this past fall within Mechanical Engineering at Purdue that focuses on assessment of alternative approaches to improving sustainability of energy production and utilization in our society.

The course covered resources, extraction, conversion, and end-use and emphasized the impacts of energy-related technologies on economics and sustainability. Different renewable and conventional energy technologies were presented including biomass, fossil fuels, geothermal, nuclear, wind power, ocean energy, and solar. Students addressed how to assess the potential for alternative energy technologies in terms of economic and sustainability metrics and gained experience in assessing different energy technologies.

In addition to homework and exams, students worked in teams on projects of their choosing that involved a technology assessment.

This new course is one of several sustainable energy course options that meet the requirements of a new energy minor within engineering.

— Jim Braun

Introduction

1. Energy production & consumption
2. Value of energy
3. Environmental impacts of energy
4. Renewable energy options

Energy Economics & Sustainability

1. Time value of money
2. Economic measures
3. Sustainability measures

Energy from Fuels

1. Fossil Fuels
2. Biomass
3. Nuclear Power
4. Hydrogen

Energy Distribution, Storage, and End Use

1. Energy transmission and distribution
2. Electric power production
3. Transportation
4. Industrial
5. Commercial and residential buildings

Energy from the Environment

1. Geothermal
2. Hydropower
3. Solar energy
4. Oceanic energy
5. Wind energy

Student Project Presentations

Case studies involving evaluation of alternative technologies for specific

Roller Coaster Class

Students taking a new roller-coaster design course at Purdue University have discovered that fun, real-world applications make solving difficult engineering problems more interesting. Mechanical Engineering Professors, who also do research at the Herrick Labs., Jeff Rhoads and Charles Krousgrill together started a roller-coaster dynamics course this year, and the approach has been shown to draw in students who ordinarily might be turned off to engineering.

“It’s like we’ve tapped a passion early in their academic careers using a non-traditional teaching approach to get them into the engineering mindset quicker,” Chuck said. “So you might

be able to break through to students who might not thrive under traditional methods.”

He and Jeff thought of creating the course while teaching another class called dynamics, which involves applying the principles of physics to mechanical systems. “One of the students in that class was a real whiz on roller coasters,” Jeff said. “He displayed some of his work on roller coasters on the course blog, and he inspired us to start the roller coaster course.”

Even though about half of the students in the class lacked the usual prerequisite, Basic Mechanics II [Sophomore Dynamics Class], the students did well,” Jeff said. “The idea was to pair a student who had taken more prerequisites with a



student who had less experience,” Chuck said. “This was a real success. They worked together well, and students learned from each other.” The presentations showed true-to-life animations demonstrating the teams’ creations in action.

— Adapted from Emil Venere’s article for the Purdue Press.

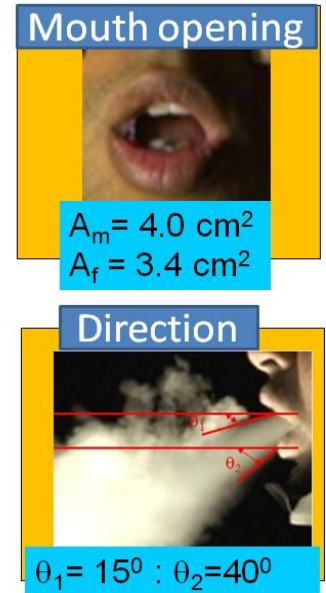
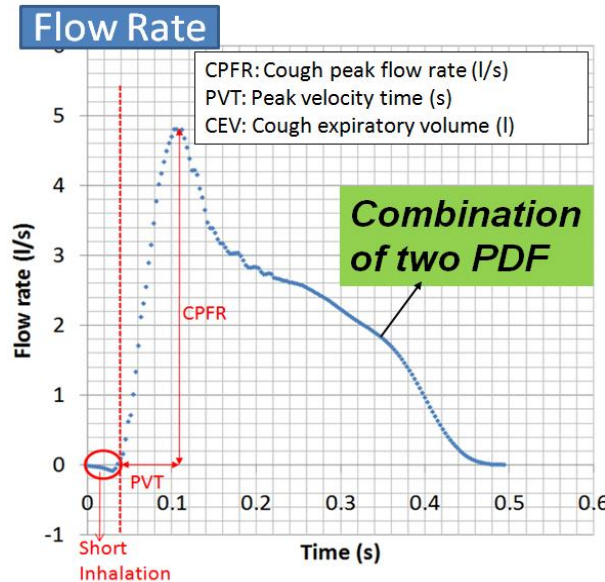
Health Related Research Airborne Transmission in Indoor Spaces

Airborne disease transmission has always been a topic of wide interest in various fields for decades.

The transmission of airborne disease starts when the disease viruses are exhaled from an infected person. The main exhalation modes include, coughing, sneezing, breathing, and talking processes. The disease viruses are transported and finally inhaled by a susceptible person. The transmission of infectious disease in indoor environments, especially in aircraft cabins, represents great risk and needs investigations.

Because of recent advancements, Computational Fluid Dynamics (CFD) has become a powerful tool for predicting the transmission of airborne diseases in indoor environments. The CFD simulations need precise thermo-fluid boundary conditions for the exhalations and inhalations to accurately predict the transport of the viruses. Thus our investigations first developed a set of equations to provide the thermo-fluid boundary conditions for coughing, breathing and talking processes.

In the study measurements were conducted to capture the exhaled flow rate, flow direction and the area of the mouth/nose opening of the human subjects. It was found that the exhaled flow rate variation over time can be defined as a combination of gamma functions for a cough; a



Flow characterization of exhaled air from a cough for a subject

sinusoidal function for breathing, and a constant for the talking process. The variables required to define these flow rate functions can be obtained from the physiological details of a person.

These models along with appropriate droplet distribution were then used to investigate the transport of droplets exhaled by an infected passenger, in an aircraft cabin.

It was found that the infectious droplets initially followed the exhaled air jet. These droplets lost their momentum quickly and then tagged along the bulk airflow in the cabin.

Based on the expiratory droplet trajectories and droplet concentration, the amount of expiratory droplets inhaled by each passenger was then calculated.

The investigations are now focused on quantifying the risk of infection for each passenger based on the amount of droplets inhaled and the potency of the viruses/bacteria. Moving forward, our efforts will be on identifying and evaluating ways to minimize the risk of infection.

*— Jitendra Gupta,
Herrick Labs. Graduate Student
working with Professor Yan Chen*

This is one of the several health related projects at the Herrick Laboratories. Prof. Chen has been studying air quality and health issues in buildings and other environments. Some of that research has been sponsored by the FAA's Aircraft Cabin Environment Research Center of Excellence. Prof. Luc Mongeau (now at McGill University) worked for many years on the acoustics of the vocal tract first for aiding the design of prostheses for people who had undergone operations on their vocal tract and then to develop technique for early diagnosis of abnormalities in the vocal folds. Prof. Katherine Petersen worked a snake robot, a concept for a prototype endoscope. Kathy has since left Purdue and is now studying to be a doctor. Prof. Kai Ming Li studies hospital noise and Prof Bolton has co-supervised or served on the committees of several bio-acoustics engineering students. Prof. Davies and her students have also been investigating models for predicting sleep disturbance due to transportation noise and they have recently completed a literature review on health effects of aircraft noise.

Prof. Greg Shaver and His Students Visit India with Prof. Jay Gore

In the fall of 2008, Professors Greg Shaver and Jay Gore hosted Professor Anuradda Ganesh of IIT-Bombay as a visiting faculty member in the School of Mechanical



Gayatri and Carrie on Cummins Women's College campus near a tree planted by former Purdue College of Engineering Dean, Linda Katehi.

Engineering. During her semester here, Anuradda taught a course on biofuels and bioenergy and collaborated with the students in Greg's research team. Little did they know that their work with Anuradda would lead them to the other side of the world only one year later! Anuradda invited Jay, Greg, and students to come to India for the 2nd International Conference on Advances in Energy Research (ICAER) which she was organizing. After several months of paper writing and trip planning, Jay, Greg, and graduate students Dave Snyder, Gayatri Adi and Carrie Hall were ready to head for India! Dave, Gayatri,

Carrie and Greg left Saturday, December 15th, and after about 18 hours on various airplanes, arrived in India very early Monday morning.

After getting a little rest, they then headed to Pune, India where they were joined by Jay, and visited Cummins Research and Technology India (CRTI). CRTI is a joint venture between Cummins, Inc. and Cummins India Limited and handles much of the design, and structural and computational fluid dynamics analysis for the Cummins Technical Center located in Columbus, IN. Monday night, they were guests of honor at a dinner hosted by Craig Barnes, CTO of Cummins India Operations, and attended by many of the company managers and executives. On Tuesday, they visited several engineering schools and research centers in Pune including: the College of Engineering, Pune; the Cummins College of



Carrie, Greg, Gayatri and Dave with Craig Barnes, CTO Cummins India, and Abhay Bhagwat, VP R&T Cummins India.

Engineering for Women (where Gayatri, and several other current and past Herrick students, completed their undergraduate education); the Automotive Research Association of India; and Cummins India.

After their whirlwind tour of Pune, they headed back to Mumbai where they attended ICAER on the beautiful campus of IIT-Bombay. The conference went from Wednesday through Friday and included many interesting talks on a variety of topics from solar ponds to fuel cells. Gayatri presented the alternative fuels work in a group session on Wednesday, while Greg and Jay gave plenary talks on Thursday and Friday. Greg presented the research activities in the Cummins Power Lab at Herrick Labs, while Jay



Greg, Carrie, Gayatri, and Dave with Professor Ganesh in the Cummins Engine Research Laboratory on the IIT-Bombay campus.

described Energy Research initiatives at Purdue. Thursday evening also included a cultural program by some of the students of IIT-Bombay which gave a wonderful flavor of the rich culture of India. The group also had the opportunity to visit Anuradda's labs which includes an Energy Systems Laboratory and the Cummins Engine Research Laboratory.

ICAER ended on Friday, and Saturday morning the group headed to the state of Orissa in eastern India to visit a Cummins-sponsored rural electrification project which Anuradda leads, and which recently received the Cummins President's Award. The Purdue team, Anuradda and several IIT-Bombay students and Cummins employees flew into Bhubaneswar, the capital of Orissa, and from there drove several hours to the remote village of Kolha. The village is now powered by a genset which runs on straight vegetable oil which the villagers extract from local seeds using an oil expeller. This electrification project was completed by IIT-Bombay in collaboration with Cummins India and the Renewable Energy and Agricultural Development Foundation in ten weeks and now provides the villagers with electricity for their homes and streets.



Jay and Greg learning about the village electrification project from Abhay and Anuradda.

After their exciting visit to the village, the group left the lights of Kolha and went back to Bhubaneswar. They then flew back to Mumbai on Sunday and spent Monday resting, visiting and shopping in Mumbai and in Gayatri, and Carrie's case, taking an Advanced Combustion final exam. Their enjoyable and enlightening trip came to a close as they again boarded a plane headed for home.

The Purdue Team—Carrie, Gayatri, Jay, Greg, and Dave—would again like to thank our fantastic hosts during our trip, Professor Anuradda Ganesh and Mr. Craig Barnes!

Where are they now?

Nishi Gupta (MSME 1984) returned to campus during the summer to visit her former advisor, Bob Bernhard. She was the first student to graduate that he advised. She is now the Vice President of the Service Product Line for Maintenance and Technical Support at IBM in Somers, NY. She has worked for IBM for 25 years since she graduated from Purdue. Pictured are Nishi with Tyler Dare, who is currently working on his Ph.D. with Bob Bernhard.



Marty and Paulette Stevenson sitting outside the Herrick Laboratories during their September visit.

Jun-Hyeung “Jay” Kim (MSME, 2002; PhD 2005) accepted a position as an Assistant Professor in the Department of Mechanical Engineering at the University of Alabama effective at the beginning of the Fall 2009 academic year. Pictured left are Jay Kim with his son, Eje. On the right are Eje and Mommy.



Josephine Lau (MSME 2005) is an Assistant Professor at the University of Nebraska-Lincoln at Omaha in the Department of Architectural Engineering. She's working in the same department as Haorong Li (Ph.D. 2004).

Rajiv Singh (MSME 2000) returned to campus for a brief visit in May. His faculty advisors were Patricia Davies and Anil Bajaj. He brought his wife, Neelima, and his son, Eshan Raj, with him. He is still employed by MathWorks in Natick, MA.



Left to right are Neelima, Eshan, Patricia Davies, and Rajiv.

Martin “Marty” Stevenson (MSME 1969, Ph.D. 1972) and his wife, Paulette, stopped by the laboratories on September 14. They were visiting family in the Indianapolis area and decided to make a trip to campus to visit the labs. He started working with Bell Labs in Indianapolis after graduation and transferred to Sandia Laboratories in Albuquerque, NM approximately 20 years ago. He's still at Sandia where he is currently a Principal Member of the Technical Staff. Marty's faculty advisor was David Tree. The labs have changed considerably since Marty was here as a student. We were doing animal research when he was here working on his advanced degrees.

Faculty Honors

Eckhard Groll, upon the recommendation of the ASHRAE Life Members Club, received the 2010 E. K. Campbell Award of Merit from the ASHRAE Members Council. The award recognizes one member a year for outstanding service and achievement in teaching with a plaque and a \$10,000 honorarium from the Society's Life Members Club. The presentation will be made at ASHRAE's 2010 Winter Conference in Orlando, Florida during the Plenary Session on Saturday, January 23. Congratulations, Eckhard, on this well-deserved honor.

Jeffrey Rhoads is one of 13 faculty members to receive a National Science Foundation early-career award, which is the most prestigious honors for outstanding young researchers in 2009. The Faculty early Career Development awards range from \$300,000 to \$525,000 in research funding over four or five years, and approximately 400 researchers win the awards annually.

Jeff will use nanotechnology and microtechnology to develop tiny mechanical devices called “resonators” for possible applications ranging from cell phones to advanced sensors and a new type of computer memory. These resonators will contain many tiny beams connected to each other that vibrate in specific patterns. The resonators could be used to amplify signals for new biosensors in medicine and research, as a new type of filter for cell phones, and for a mechanical computer memory system that harnesses vibration patterns.

The research includes educational components using Purdue's nanoHUB—the Web portal of the National Science Foundation's Network for Computational Nanotechnology—as well as Purdue's Summer Undergraduate Research Fellowship, or SURF, program. Rhoads will develop and deploy on the nanoHUB a software tool to simulate the behavior of the resonators, a new K-12 education curriculum on emerging micro electromechanical and nano electromechanical systems, and college-level course materials and lectures associated with a new course on the systems.

Staff Honors

On January 28, **Fritz Peacock** was honored for 25 years of service to the University. There was a luncheon to honor his milestone, and he had an official photo taken with a representative of the university. Watch the spring issue for more information.

Student Honors

Margaret Mathison (current Ph.D. student) was awarded a Lambert Teaching Fellowship for the 2009-10 Academic Year. She was one of three recipients. The Ward A. Lambert Graduate Teaching Fellowship in Mechanical Engineering was established in memory of Ward Lambert who was a legendary Purdue baseball and basketball coach.

The Lambert Fellowship is for ME doctoral graduate students who have the potential and desire to pursue an academic career. The fellows are paired with master teachers from the School of Mechanical Engineering who serve as mentors during the one-year fellowship period. In the first semester the Lambert Fellow assists the Professor with the class, typically a sophomore or junior level class in ME, and teaches occasionally under the supervision of the Professor. In the second semester the student teaches the same class with the Professor who is there to assist and give feedback and advice.

Yoon Shik Shin, (current Ph.D. student) was honored with the Institute of Noise Control Engineering Student Paper Competition prize for his paper "Inflow Treatment for Small Scale Axial Fans Under Unfavorable Inflow Conditions" co-written with Prof. Bolton and presented at INTER-NOISE 2009.

Yoon Shik along with other Herrick acoustics students graciously volunteered to help at the Internoise conference when they were not attending sessions or presenting papers. They did an outstanding job assisting with registration and helping attendees.

Matías Zañartu, (current Ph.D. candidate) in the School of Electrical & Computer Engineering and a member of the Student Representative Committee at Herrick Laboratories, received the Best Student Paper Award in Speech Communication at the Acoustical Society of America Meeting in Portland for the poster entitled "An impedance-based inverse filtering scheme with glottal coupling" presented in the special session on source-filter interactions in biological sound production.

The paper was co-authored by **Julio Ho** (also a current Herrick student) from Biomedical Engineering (BME) at Purdue, Daryush Mehta from MIT-Harvard, Robert Hillman from MGH/MIT-Harvard, and George Wodicka from Purdue. The project is part of the collaboration between Prof. George Wodicka (Head of BME at Purdue) and Prof. Robert Hillman, Research Director of the Center for Laryngeal Surgery & Voice Rehabilitation at the Massachusetts General Hospital in Boston, Massachusetts.

Graduations

Ethan Brush (MSME August 2009), Development of a Dynamic Model for Subsurface Damage in Sandwich Composites. Ethan is employed by Raytheon in Boston.

Michael P. Bunce (MSME August 2009), *Optimization of Soy-Biodiesel Combustion in a Modern Diesel Engine*. Mike works at Oak Ridge National Laboratory in Tennessee.

Neha Chandrachud (MSECE August 2009), Classification of the Health of Diesel Engines Using Sparse Linear Discriminant Analysis. Neha took a position with Cummins Inc.

Hoyt Chang (MSME December 2009), *Environmental Acoustics*. Hoyt is currently working for Pratt & Whitney in Connecticut.

Li-Jen Chen (Ph.D. December 2009), Investigations of Mechanical Stresses **Within** Human Vocal Folds During Phonation.

Doug Cook (Ph.D. May 2009), Systematic Structural Analysis of Human Vocal Fold Models.

Tanya (Wulf) Gramm (MSME December 2009), A Study of the Effect of Innovatively Textured Portland Cement Concrete Roadway Surfaces on Tire-Pavement Noise.

Kamran Gul (Ph.D. December 2009), Modeling and Analysis of Engine Cold-Test Cells for Optimizing Driveline Design for Structural Reliability and Engine Assembly Defect Diagnostics. Kamran is working for Exxon-Mobil in Houston, Texas as a Senior Research Engineer.

Kwan Woo Hong (Ph.D. August 2009), Acoustical Estimation of Macroscopic Properties of Poroelastic Materials. Kwanwoo is now working for Samsung Digital Appliances in Suwon, Korea.

Andrew Jessop (MSME August 2009), *A Study of the Effects of Panel Stiffness on Transmission of Low-Frequency Sound*. Andy is continuing his Ph.D. studies at Herrick Labs working with Prof. J. Stuart Bolton.

Woohyun Kim (MSME December 2009), *Evaluation of a Virtual Refrigerant Charge Sensor*. Woohyun is continuing his Ph.D. studies at Herrick Labs working with Professor Jim Braun.

Robin Kusmanto (MSME August 2009), Modeling and Simulation of an Optimized Wireless Network in a Naval Ship System of Systems. Robin works at AREVA in Lynchburg, VA.

Shawn McKay (Ph.D. December 2009), *A Control Theory Based Hybrid Architecture to Anticipate and Shape Adversarial Behavior*. Shawn took a position with Land Consulting in Los Angeles, CA.

Sagnik Mazumdar (Ph.D. December 2009), *Transmission of Airborne Contaminants in Airliner Cabins*. Sagnik accepted a Postdoctoral Fellow position in the University of Medicine and Dentistry at Rutgers University in New Jersey.

S. Hales Swift (MSME December 2009), Potential Health Effects of Aircraft Noise.

Herrick Laboratories' News

Engagements

Craig Bradshaw (current Ph.D. student) gave Shawna Goekler her engagement ring on August 4. She is a third year student in Purdue's Vet School. The happy couple will either marry this spring or wait for two years for her to complete her studies.

Matt Houtteman (current MSME student) was engaged to Alison Baroody on September 25, 2009. Alison is a Ph.D. student at Purdue in Child Development and Family Studies. The happy couple met at a graduate student gathering at St. Tom's and are planning the wedding there on July 10, 2010.



Gauri Joshi (current MS student) and Soumya Jain were engaged on May 16. The two have known each other since high school, and Gauri has an internship at Lutron in Coopersburg, Pennsylvania this fall where Soumya works. No date has been set for the wedding.

Weddings

Tyler Dare (current Ph.D. student) and Jennie Brencic exchanged nuptials on October, the same weekend as the Herrick Laboratories Industrial Advisory Committee meeting. The couple plan to live in the greater Lafayette area until Tyler completes his degree.

James Mynderse (current Ph.D. student) and Michelle Maynor were married on August 2nd. The ceremony was at Zephyr Cove on Lake Tahoe, NV. Michelle is a Ph.D. student in Purdue's School of Pharmacy, Dept. of Medicinal Chemistry and Molecular Pharmacology.

Tanya Wulf (MSME, 2009) and Taylor Gramm were married on Sunday, October 25 near Sioux Falls, South Dakota. Tanya was employed by Threshold Acoustics in Chicago until the wedding. The happy couple relocated to the Sioux Falls area.



Births



Daniel Finfer (former undergraduate student) and his wife, Yehudit, are the proud parents of a baby girl, Avital, born on October 20, 2009. Daniel received his BSME from Purdue in 2002 and received his

MSc (2004) and PhD (2009) degrees from the University of Southampton. He is currently employed by Silixa Ltd. in Elstree, UK.

Kamran Gul (Ph.D. Dec. 2009) and his wife, Javaria Asif, welcomed their daughter Aysel on September 19.

Shashi More (current Ph.D. student) and his wife, Vibha, welcomed their daughter Sae on September 19.

Jong Beom Park (Ph.D. 2006) and his wife welcomed a new addition to the family in September.

Daniel Robinson (MSME 2007) and his wife, Sara, welcomed their first child on May 20. The new arrival is Daniel Thor Robinson who weighed 8 pounds 10 ounces and was 20 inches long. Sara and baby Daniel are doing well.



Bryan Song (Ph.D. 2001) and his wife, Esther, welcomed their 3rd child Caleb on July 30.

Hejiang Sun (current Visiting Scholar) and his wife Yunxia Zhang welcomed their son Zihe on March 18.

Brandon Woodland (current MSME student) and his wife, Christine, welcomed their first child, a boy named Raiden, on September 20 at 10:48 p.m. Raiden was 6 pounds 9 oz. and was 18 3/4 inches long. Both baby and mother are doing well.

Matias Zanartu (current Ph.D. student) and his wife Sandra welcomed their daughter Julieta on March 8.

Wangda Zuo (current Ph.D. student) and wife, Wenyan Zou, welcomed daughter Isadora on October 7. Her Chinese name is Xiangyu, which comes from her dad being from Xiang (Hunan) and her mom from Chongqing (Yu).

Anniversary

Normally, wedding anniversaries are omitted from the newsletter as are birthdays and other annual events, but occasionally, one needs to be mentioned. That's the case with **Phyllis and Robert Hurst**. They celebrated their 60th anniversary in May. Phyllis retired from the Herrick Laboratories where she worked for Werner Soedel as the administrative assistant for the Journal of Sound and Vibration and also was the conference secretary for a number of years. Bob is also a Purdue retiree, having worked as a biology professor. Congratulations to the happy couple.



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News about You and Address Changes

We are always interested in hearing your news, and we want to be kept up-to-date on current addresses. Please send notes to Judy Hanks or to the e-mail address below. Don't hesitate to let us know of other alums who have moved. Photos are always welcome.

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