newsletter

Ray W. Herrick Laboratories

Purdue University, West Lafayette, IN 47907-2031

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Director's Corner

In October we held 52nd Industrial Advisory Committee (IAC) meeting at the Laboratories. Apart from the valuable advice we receive from the committee, these events give us time reflect on the year's activities and take stock of where we are and how we should move forward. Our biggest challenge in the next few years will be the fundraising for the renovation and expansion of the Laboratories.

This has been a very busy year for all faculty because in addition to usual types of one-investigator one-student research proposals there has been large amount of effort expended on center-type activities. Yan Chen and Jim Braun brought together large groups of people from Universities and Industry and wrote proposals for multi-disciplinary, multi-university research centers focused on Advanced Buildings and Engineered Spaces. Monica Ivantysynova and Luc Mongeau have been working with a team at the University of Minnesota on another Center proposal on small and efficient fluid power systems; this has just been awarded. Bob Bernhard worked on a proposal for a signature area in acoustics, bringing together people from Engineering, Liberal Arts and Science; Luc Mongeau is now working with faculty across the University on an acoustics initiative led by Bob Novak of the Speech, Language and Hearing Science Department. The faculty have also been involved in group proposals on prognostics and diagnostics, intelligent robotics, human performance, energy and the environment. Our thanks also to many of our alumni in their efforts to gain support from their companies to strengthen these proposals.

I wish you well for your endeavours in the coming year. Whenever you are in the area, please drop in.

Patricia Davies

Buildings for People—A Living Laboratory

One of the ideas that came out of Yan Chen and Jim Braun's proposal for the Center for Advanced Buildings was to make a new administrative wing (offices, conference rooms, kitchen, etc.) a living laboratory where new building concepts could be tested out in a realistic environment. This was also part of their proposal for a new Discovery Park Center on Engineered Environments. Engineered environments are designed and constructed to provide appropriate conditions and functionality for human habitation or food preservation and include buildings, refrigerated warehouses, transportation vehicles and enclosed spaces for extreme environments (e.g., submarines and extraterrestrial vehicles). Engineered environments have strong linkages to many of the most significant problems facing society during the next century, including energy, environment, terrorism, disease, and an aging population. Researchers within Herrick Labs are developing new knowledge, technologies, processes, and integrated solutions to enable high-performance engineered environments that provide improved occupant health and productivity, sustainability, security, and customer satisfaction. Research activities include issues related to indoor air quality and thermal comfort, environmentally-friendly cooling/heating technologies, automated diagnostics, intelligent controls, impacts of indoor environmental conditions, including thermal conditions, air quality, acoustics and vibrations, on human perceptions and performance, system modeling and optimization, etc.

Expansion and Renovation of the Laboratories Launch the of Herrick Fundraising Campaign

The timing of the IAC meeting coincided with the official ending of the Mechanical Engineering fundraising campaign. The Dean of Engineering hosted a lunch to celebrate the ending of the ME and other campaigns and to announce the next set of projects for engineering which includes fundraising for the Ray W. Herrick Laboratories renovation and expansion. The Mechanical Engineering campaign was to fund a new wing of the ME building where space, like at the Laboratories, is very tight.

The Herrick Laboratories campaign is to generate funds to renovate and expand existing space, build a new office/ administration building, thus freeing up the barn for research and shop expansion, build the Perception-Based Engineering Laboratory, and expand the current wings so that we can house the expanding thermal systems, acoustics and vibrations, structural dynamics and prognostics, engines and electro-mechanical systems research programs. At the start of the Fall 2005 semester we had 75 graduate students at the Laboratories and space and utilities are stretched, and the old building is certainly in need of renovation.

This is an 11 million dollar fund raising campaign. For us to be successful in this ambitious campaign, we will need the help and support of our alumni and friends—either in direct contributions to the campaign or by helping us in the campaign.

If you wish to make a donation, you should make your check payable to the Purdue Foundation. On the memo/ notes line on the check write "Herrick Laboratories Building Fund" and re-emphasize this destination in your letter and/ or accompanying paperwork. If you would like to start or continue to contribute to support the general activities at the Laboratories, just make it "For Ray W. Herrick Laboratories".

You can send the check to the Director (Patricia Davies) at Ray W. Herrick Laboratories, and we will forward it to the University Development Office, who handle all the paperwork and make sure that your gift is acknowledged for tax purposes. Or, you can also send it directly to them at: Dick and Sandy Dauch Alumni Center, 403 W. Wood Street, West Lafayette, IN 47907-2007.

There is a place on the University Development website where you can make a credit card donation. To do this and find out about other ways of giving to Purdue start at: http://www.purdue.edu/udo/giving/give.shtml.

All contributions are welcome from the smallest to the entire 11 million! If you have questions, about giving, deferred gifts, etc. contact John Sanderson, the ME Development Officer, at (765) 494-9769 or send him e-mail at sanderjd@purdue.edu.

For all of you who have contributed in the past, my sincere thanks, your gifts really help us out tremendously.

Note on giving to Purdue: When you make gifts to the University, you must designate the destination of that gift. Don't assume because you are a Herrick alumnus/alumna it will make its way to us—it will not. It will, of course, be used for the general benefit of the University, but will perhaps not directly help Herrick Laboratories projects.

Discovery Park

It is interesting to see Discovery Park grow up next to us across Intramural Drive—Purdue President Martin Jischke's vision for that endeavour echoes much of what Bill Fontaine valued and fought for when establishing the Laboratories nearly 50 years ago. In particular, strengthening the ties between industry and Purdue University and using the results of our fundamental research to solve real-world problems and help industry develop new technology that improves people's lives. Having these exciting research centers in close proximity helps facilitate the establishment of new research relationships. Two of the newer Discovery Park Centers are focused on Energy and the Environment, areas in which Herrick Labs researchers have made, and continue to make, contributions, and already faculty here are collaborating with people on proposals in these centers. If you would like to learn more about Discovery Park follow the link: http://web.e-enterprise.purdue.edu/wps/portal.

Research on Automotive Suspension Design at Herrick

Professor Doug Adams and Graduate Student Muhammad Haroon have demonstrated a new method for analyzing the components of automotive suspension systems in work aimed at improving the performance, reducing the weight and increasing the durability of suspensions. They have demonstrated that their method can be used to show precisely how a part's performance is changed by damage and also how its changing performance affects other parts in the suspension.

Muhammad Haroon installs sensors in a car suspension system to test out his fault detection monitoring system.

The approach represents a potential change in how automotive suspension systems will be designed in the future. The way it's done now is that each of the parts making up the suspension are manufactured to be as rugged as possible. Usually, different suppliers provide the different components, and what they do as good suppliers is optimize the strength and durability of their component.

The problem with this approach is that some of the parts are over-engineered and heavier than they need to be because they are designed to withstand greater forces than they will encounter once they are integrated into the system. This results in a heavy suspension system that doesn't handle very well, and higher fuel and steel consumption than you would like.

A better, more integrated approach that automakers are now pursuing is to test the entire suspension by analyzing parts, not as isolated units but as interconnected components. That way, we will learn more precisely how individual parts interact with each other, and we will be able to design parts that are just as light and rugged as they need to be but not too heavy or rugged. The integrated approach is particularly important for the design of suspension systems because one damaged part can cause heavier strain on surrounding parts. If engineers know which parts are most prone to damage, those parts can be built heavier and other parts can be made lighter, reducing the overall weight and improving the performance of the suspension.

The method developed by Doug and Muhammad senses naturally occurring vibration patterns to detect damage to components. Such "fault-identification" methods may not only provide information for designing better suspensions but also might be used for future "structural health monitoring" systems in cars that automatically detect damaged parts and estimate how long they will last. When perfected, such a "systems approach" could provide a competitive edge to companies that make suspension parts.

The work is funded by ArvinMeritor Inc., which makes suspension components at its plant in Columbus, Indiana. The research also is supported by the Center for Advanced Manufacturing, located in Purdue's Discovery Park, the university's hub for interdisciplinary research.

Some of their findings were presented at the International Mechanical Engineering Congress and Exposition in Orlando, Florida on November 9. The congress and exposition was sponsored by the American Society of Mechanical Engineers. The paper title was "Active and Event-Driven Passive Mechanical Fault Identification in Ground Vehicle Suspension Systems."

What Doug and Haroon have shown in this particular paper is that they can detect very small changes in a part's performance when it is damaged. They've also been able to quantify the changes by turning data into information using a software algorithm that utilizes an embedded sensitivity model, which they developed.

This is an edited version of a press release written by Emil Venere, Communications/Marketing Specialist with the Purdue University News Service. The press release was posted on the University News Web site and was available to journalists throughout the nation. The article may have appeared in your local newspaper in its entirety.

Herrick Short Courses and Conferences

Ginny Freeman and the Conferences and Short Courses Administration continue to be busy with new short courses and programs developing annually. Since our last newsletter, there have been several programs organized and hosted by the laboratories.

Workshop on Advanced Buildings

On March 8-9, 2005 Herrick Labs organized and hosted the Workshop for Industrial Participation in the National Science Foundation Engineering Research Center for Advanced Buildings**.** Approximately 35 representatives from industry and universities from around the country attended the workshop. The Lead Team of the Engineering Research Center Proposal Team from Purdue University are Qingyan Chen, James Braun, Leah Jamison, Heidi Diefes-Dux, and Eckhard Groll. The primary goals of the workshop were to understand the opportunities associated with involvement in the Center for Advanced Buildings and to understand industrial needs focusing on the technologies needed to establish college programs that integrate research results into curricula for precollege and college students, practitioners, and teams of undergraduate and graduate students in research and education. It also addressed the long-term strategic vision to strengthen the diversity of the United States engineering and scientific workforce and to encourage committed, cross-disciplinary teams to integrate fundamental science and engineering research with research focused on the advancement of technology through test beds designed to test theory and functionality in proof-of-concept systems.

Prognostics and Diagnostics Short Course

During the summer, Doug Adams organized and presented a $2^1/_2$ day short course, Diagnosis and Prognosis in Mechanical Systems. The short course was held on July 25-27 and focused on three aspects of mechanical health management: (1) loads identification, (2) diagnosis, and (3) prognosis. The state-of-the-art was reviewed in modeling, sensing, data interrogation and predictive analysis for characterizing mechanical systems over their life-cycles. Live and simulated demonstrations were provided to reinforce concepts. One of the goals of the course was to encourage interactions among participants and address common challenges and solutions in diagnostics and prognostics for health management in mechanical and structural systems. The course was attended by outside participants as well as 30 Purdue students from engineering.

NoiseCon 2005 in Minneapolis

Stuart Bolton and Patricia Davies served as Co-Chairs of Noise-Con 2005 which was held jointly with the 150th Meeting of the Acoustical Society of America in Minneapolis, Minnesota on October 17-19. Bob Bernhard was co-chair of the meeting with Kan Kato of Cummins. One hundred ninety eight papers are published in the Noise-Con 2005 Proceedings covering a broad range of topics related to noise control. Plenary sessions at the start of each day were focused on Environmental Noise, Tire-Pavement Noise, and Hospital Noise. Two workshops were held: one on Noise Policy and one on Power Plant Noise. Session topics included product noise measurement, case studies in noise and vibration control, products for noise control, sound quality, community noise, local and state noise policy, speech issues in buildings, array measurements for sound visualization, numerical acoustics and acoustical materials. For more information on conference proceedings see *http://www.inceusa.org*.

Herrick Labs Sponsors a Symposium

More recently on November 1-3, the "Quiet Asphalt 2005: A Tire/Pavement Noise Symposium" was sponsored by the Asphalt Pavement Alliance and Purdue University at the Holiday Inn Select, City Centre in Lafayette. Robert Bernhard, Donald Johnson, and Will Thornton from the Herrick Laboratories organized the majority of the symposium. Twenty hours of lectures, displays, tours of the Institute for Safe, Quiet and Durable Highways and the North Central Superpave Center at Purdue occurred. Demonstrations were presented for realistic listening experiences comparing pavement, synthesizing some combination cases and acoustical perception concepts. There were listening booth displays on highway noise measurement methods and perception of sound and noise as well as on quiet asphalt pavement topics including European scanning tour results, quiet asphalt mix design and construction techniques. The Labs developed demonstration material that was an integral part of the symposium. Seventy-seven people from around the world attended the symposium. A limited number of manuals and CDs are available for sale. Check the Herrick Laboratories' SQDH Web page for details at *http://widget.ecn.purdue.edu/~sqdh/index.shtml.*

Quiet Pavement Workshop Coming

Next year, from April 10-12, 2006, the Quiet Pavement Workshop will be sponsored by John A. Volpe National Transportation Systems Center, the United States Department of Transportation, Research and Innovative Technology Administration (RITA), and the Volpe Center. It will be organized by Robert Bernhard and Donald Johnson of Purdue University and held in Indianapolis, Indiana.

Compressor and Refrigeration Conferences and Short Courses

Fountain in front of the Hovde Hall of Administration on the Purdue Engineering Mall at night. The fountain is a favorite spot for students and visitors, especially on a warm, sunny afternoon.

The biennial Compressor and Refrigeration Short Courses, organized by faculty from the Ray W. Herrick Laboratories, will be held at Purdue University on July 15-16. These courses will start on Saturday afternoon and end late in the afteroon on Sunday. Immediately following the short courses on July 17-20, the 18th International Compressor Engineering Conference and 11th International Refrigeration and Air Conditioning Conference will be held concurrently at Purdue University so registration for either conference allows attendance at both conferences. They will start on Monday morning and end on Thursday afternoon. Each attendee can choose from a list of topics for those that are most appealing. At least one plenary session will be a panel discussion highlighting the latest breakthroughs in technology or alternative technologies in research and industry. Invited keynote speakers will address current, world-wide issues of interest. The popular reception, steak dinner at The Trails, and a great banquet are still included in the conference registration fee.

Guests are Welcome

Family members or others who will be accompanying conference attendees may participate in organized activities on two days. Each day has a separate theme. Transportation, lunch, and tickets are provided in the daily fee. More information will be posted on the conference Web site at a later date.

Is Attending For You?

If you're trying to decide if you want to attend the conference, here are some reasons to consider attending the short courses and conferences:

- Excellent opportunity for practitioners and researchers in industry, government, consulting offices, laboratories and universitites to reach an audience of 500-600 participants from over 30 countries.
- Preeminent forums for presenting compressor and refrigeration/AC system research results and state-of-the art technology.
- Discuss problems and solutions on the important issues of compressor technology, new refrigerants and refrigeration technology and efficiency.
- Invited keynote speakers addressing current, world-wide issues of interest facing society today.
- Panel discussions highlighting the latest breakthroughs in technology, alternative technologies in research and industry.
- Opportunity to network with attendees and officers from industry organizations.

Organizing Committee

James Braun is the General Conference Chair. Other people from the Herrick Laboratories on the organizing committee are Doug Adams, Ray Cohen, Lorenzo Cremaschi, Patricia Davies, Eckhard Groll, Werner Soedel, and David Tree.

Contact Information

If you'd like additional information that is not available on the conference Web site, please contact Virginia D. Freeman, Conference Secretary at the Herrick Laboratories. Mailing information is on the back cover. You can contact her by phone at (765) 494-6078 or by e-mail at herlconf@ecn.purdue.edu.

Upcoming Deadlines for the Compressor and Refrigeration Conferences

- April 10, 2006—manuscripts due to Conference Organizers
- July 15-17, 2006—short courses take place
- July 17-20, 2006—conferences occur.

Check the Conference/Events website at *http://www.ecn.purdue.edu/Herrick/Events/2006conf/index.html* for updated information.

Herrick Fall Picnic

To welcome new graduate students to the Herrick family, the student committee organized a picnic shortly after classes began. The festivities were held outside in the grassy area by the West Wing. Bob Brown and Fritz Peacock manned the grill and turned the burgers and hot dogs. The food they prepared in advance quickly disappeared and a long line waited patiently for more food to cook. There were lots of smiles and a great turnout. Other social events are planned for this year so look for additional photos.

Jon White was instrumental in the planning and organizing. He even did most of the shopping. Congratulations on a job well done.

Bob Brown and Fritz Peacock at the grill turning burgers. Stuart Bolton may be supervising the cooking, or is just first in line for food!

The volley ball players show off their fun-filled style and camaraderie. From left to right are Daniel Robinson, Tim Johnson, Jon White, Muhammad Haroon, Emily Levi, Nick Stites, Nasir Bilal, Janette Jaques, and Kamran Gul.

Left to right are: Jennifer Gosselin, who is a member of the student committee; Margaret Mathison, new graduate student; Adam Wichman, also a new graduate student; and Kelly Prater, a guest of Adam.

Faculty, Staff, and Student Awards

Faculty Honors

Eckhard Groll was recognized for his work with three honors since the Spring newsletter. He received the 2005 Wilbur T. Pentzer Achievement and Leadership award for outstanding contributions to the growth and well-being of the International Institute of Refrigeration (IIR) and the U.S. National Committee of the IIR.

He received the 2004-05 Charles B. Murphy Award for outstanding undergraduate teaching for meritorious and effective performance in the instruction of undergraduate students at Purdue University. The Murphy Award is the university's highest undergraduate teaching honor. Only a few faculty members are chosen for the honor annually. The recipients' names are included in the engraved "Book of Great Teachers," a plaque in the Purdue Memorial Union.

The Teaching Academy Executive Council hosted the annual recognition ceremony where he and eight other faculty members were named Fellows of the Academy. The Academy also named five faculty members as Associate Fellows. The ceremony was held in the Faculty Lounges of the Purdue Memorial Union on Monday, October 24. Purdue University President Martin C. Jischke gave the keynote address and Provost Sally Mason presented the certificates. A wine and cheese reception followed the ceremony.

Eckhard will be in the Teaching Academy along with previous fellows from the Herrick Laboratories, Doug Adams and Charles Krousgrill.

Congratulations, Eckhard, on these well-deserved recognitions.

Jim Braun, Yan Chen, David Tree were elected to Fellow grade in the American Society of Heating, Refrigerating, and Air-Conditioning Engineers. The presentation was made at the ASHRAE Winter Meeting in Chicago in January, 2006. (See photo on the back page).

Monika Ivantysynova, the Otto Maha Named Professor of Fluid Power Systems, was one of several professors featured in an article in the Lafayette Journal and Courier newspaper for her decision to move to Purdue from Germany, and for her research to eliminate valves from hydraulic actuation systems making them more efficient and more compact. The energy saving actuators will reduce fuel consumption.

She submitted a long-term multidisciplinary grant to the National Science Foundation valued at $18 million. The National Science Foundation visited her lab in December, and her Engineering Research Center was funded.

Staff Honors

Fritz Peacock received a note of gratitude from the Purdue Grand Prix Foundation for his assistance with the annual Grand Prix. Fritz has served as Chief Technical Inspector and Grand Prix Safety Committee member since 1989. He was on the Aviation Technology Grand Prix team as an undergraduate student in 1964. The Spring 2005 Grand Prix was able to provide $9,000 in scholarships to 19 students from funds raised at the event.

Student Honors

Song Liu was one of two recipients of the Best Student Paper Award at the 2005 IEEE/ASME International Conference on Advanced Intelligent Mechatronics. His paper was entitled, "Automated Modeling of Cartridge Valve Flow Mapping." There were only 5 finalists for the honor.

New Faces

John Latham

Two new people joined the Herrick family. **John Latham** is a new Purdue employee and works with Building Services. Before coming to Purdue he was employed for over 11 years as a plumber at Creeds Plumbing. When not at Purdue, he enjoys working with vehicles, actually anything with wheels and a motor, and materials like metal and wood. He also enjoys gardening.

Debra Istwan

Debra Istwan started working in the Business Office on October 10. She worked at CTS Microelectronics for over 14 years, and the last 7 years she was there, she was Payroll Administrator so she has a good background with numbers and finances. She enjoys jewelry, cooking, and is a cat fanatic. She has three cats. Rachel is a Siamese, Ra is a Bengal, and Felix is a mixed breed. Welcome to John and Debra.

Alumni Update

Herrick Lab Graduates Cruise the Caribbean

When most people go to the Caribbean on a vacation cruise, it's to kick back and enjoy the sun and aqua blue water while somebody else steers the way. Herrick Lab graduates Jack Elson (PhD '72) and Don Coates (PhD '70) and their wives, Anne Elson and Pat Coates, also Purdue graduates, enjoy sailing the Caribbean together, doing their own steering, "bareboat cruising" that is. The four have been good friends since attending Purdue University and enjoy a sailing adventure together about every three years.

This year they cruised the northern Grenadine Islands, part of the independent country of St. Vincent and the Grenadines, and a group of 600 islands in the Caribbean Sea located north east of Venezuela. They sailed to the small islands of Bequia, Mustique, Canouan, Union and Tobago Cays. Bareboat cruising offers both the adventure of going to new places and the challenge of getting the boat there yourself. The water is generally calm and peaceful, but the group met with eight-foot waves during a day crossing from Union Island to Bequia Island. The new chartered 42-foot catamaran named "Wind Hover 2" handled the rough waters well, outfitted with sails, two diesel engines, four cabins, galley, salon and unlimited warm ocean water for snorkeling and enjoyment.

So why would anyone want to go on a Caribbean vacation and work so hard to enjoy it? The answer is two Purdue Herrick graduates whose love of technology extends even to vacations, and even after all these years. The thrill of navigating coral reefs, snorkeling in the crystal calm waters, making sure the sails are in perfect trim for that extra .1 kph and ensuring that everything is working right keeps these four interested in the adventure and the challenge. They acknowledge there are people who wouldn't like this kind of vacation. This group loves doing something new and different and being right there with the view and places you just can't get to under most organized trips. A lot of great places are only accessible with a small boat. The group is talking about their next bareboat cruise being to the Greek islands.

During the rest of the year, Jack is Director of Transportation Scroll Engineering at Copeland Corporation in Sidney, Ohio. He was an Assistant Professor at Bradley University in Peoria, Illinois, after graduating from Purdue, and then moved to Sidney where he has worked for Copeland (Division of Emerson of St. Louis, Missouri) since July 1973, where he and Anne, who owns her own real estate company, have raised two lovely daughters. Jack has remained involved with Purdue's Herrick Lab throughout his career including participation in the Industrial Advisory Committee and International Compressor Conferences. Jack was responsible for developing Copeland's first production scroll compressors and has received several Emerson Technology Awards for his work in scroll compressor technology.

Don is currently Assistant Professor of Technology at Kent State University and lives in Canton, Ohio, having retired from Hoover Company as Director of Research. Previously Don worked for Whirlpool Corporation as Manager of Whirlpool Washers, Vice President of Engineering for Speed Queen Company, Director of Dishwasher Engineering and Advanced Development for the Frigidaire Company. One of Don's career highlights was the invention of the water filter technology used in Frigidaire and other refrigerators. He is currently teaching courses on managing research and innovation, energy/power and industrial controls. He is also establishing educational programs on fuel cells and technical innovative problem solving. Purdue has honored Don as Distinguished Engineer and Distinguished Mechanical Engineer. Don's wife, Pat, works in health care administration.

Herrick Laboratories' Family News

Engagements

Lorenzo Cremaschi (current Post Doctoral researcher) and Selen Aydogan (currently a Ph.D. student in Chemical Engineering) are engaged to be married. No wedding date has been set.

Weddings

Rudy Chervil (Current Ph.D. student) and Sheila Brun were married August 5, 2005 in West Lafayette, IN.

Marco Corradi (Visiting Research Assistant, 2004) and Alessandra Malaman were married on June 18, 2005 in Padova, Italy. Stefan Bertsch (current Graduate Student) and Josephine Lau (MSME August, 2005) were able to celebrate the special occasion with Marco and Alessandra.

Shivkumar Duraiswamy (MSME 2003) and Revathy Sitaraman were married August 22, 2005 in Chennai (Madras), India. Shankar Sundararaman (current Ph.D. student) was able join Shiva and Revathy on their special day.

Rajani Ippili Kanth (Ph.D. 2004) and Nagajyothi Varanasi were married on August 20, 2005 at Visakhapatnam, India.

Yong Joe Kim (Ph.D. 2003) and Min Kyung Kang were married in Seattle, Washington on October 8, 2005.

Shashi More (current Ph.D. student) and Vibha Mulekar were married on December 23 at the N.I.T. Hall in Nagpur, India. Vibha is an architect.

Jong Beom Park (current Ph.D. student) and Jueun Lee are planning a December 16, 2005 wedding in the Yoksam Catholic Church in Seoul, South Korea. Jueun works for Yahoo Korea.

Births

Audra Brickner, former Director of Development for the College of Mechanical Engineering and the Herrick Laboratories; her husband,Trey; and their daughter, Taya; welcomed a new member of family, Callie Jeanne, on June 26 at 11:26 a.m. Callie weighed 8 pounds and 8 ounces. She was 20 3/4 inches long with RED hair. Taya could not be more excited about her new baby sister! Audra accepted a position with Colorado State University and left Purdue on January 20.

Kiho Yum and his wife, Jinhee Park, announce the arrival of their daughter, Joonah Yum, on June 3 at Home Hospital. She has black hair and brown eyes the same as her parents. Her older brother, Joonki Yum, is very happy to be the big brother and enjoys his sister very much. Since the arrival, Kiho and his family have moved back home to Korea.

Semih Sezer (Visiting Scholar), his wife, Kevser, (and brother, Melih Sabri) welcomed their son, Enes Salih, to the family on June 20, 2005.

Scott Thomson, (Ph.D. 2004) and wife, Shanna, announce the birth of their daughter, Nicole, on October 10, 2005.

Graduates

Mert Geveci - Ph.D., *Robust Cylinder Health Monitoring for Internal Combustion Engines.* Mert accepted a position with Cummins in Columbus, Indiana

Kenji Totsuka - MSME, *Tone Curve Stabilization for Color Electrophotography.* Kenji is working with Lexmark in Lexington, Kentucky

Vincent Badagnani - MSME, *Method for Predicting the Acoustic Spectra of Axial Flow Fans*. Vince moved to Seattle, Washington to accept a position with Boeing.

Josephine Lau - MSME, *The Performance of Floor-Supply Displacement Ventilation in Workshop Configurations with Measurements and Simulation Studies.* Josephine is now a Ph.D. student at Penn State University in College Station, Pennsylvania.

Rudy Chervil - MSME, *Air Pollutant Emissions and Mitigation by Diet Manipulation at Two High-Rise Layer Barns.* Rudy is pursuing a Ph.D. at Herrick Laboratories under the direction of Professors Eckhard Groll and James Braun.

Richard D. Widdle, Jr. - Ph.D., *Measurement and Modeling of the Mechanical Properties of Polyurethane Foam.* Rich accepted a position with Boeing in Seattle, Washington.

Birthday Celebration

Doug Mandic (MSME 1989) celebrated a birthday milestone during the summer when he turned 40. A surprise birthday party was planned for him on June 25. Contributions were collected to send Doug to race car driving school.

In Memoriam Lei He, Acoustics Graduate Student

The Herrick Laboratories family was saddened by the unexpected and tragic loss of Lei He at the end of August. Lei was working with Stuart Bolton on his doctorate in acoustics. His MSME degree in acoustic arrays was conferred in 2004. He was from Shanghai, China.

Stuart Bolton wrote of his student, "Lei was a very intelligent and inquisitive student who brought an exceptional degree of creativity to his research.

He was a very positive individual and a pleasure to work with; I will miss our conversations greatly. His death is tragic at both a personal and professional level—I was sure that he had a very bright future in acoustics research."

On September 6, the Herrick Laboratories gathered to remember their fellow colleague. Lou Ann Hamilton from the Office of the Dean of Students spoke with the Herrick family to offer the support of the University in dealing with his tragic loss.

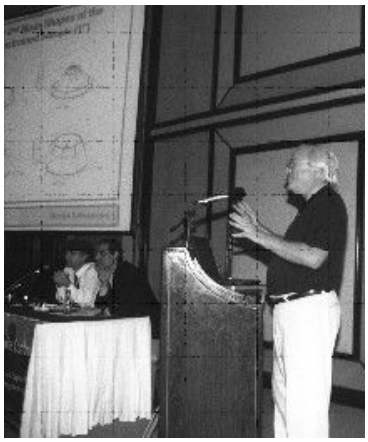
His parents visited Purdue from October 20 to October 30 and spent October 24 and 25 at the labs. A tour was conducted by the Chinese students and Stuart Bolton. On Tuesday, his parents were given a large color photo portrait of the picture shown here and a lithograph of the Ray W. Herrick Laboratories. A collection was taken to help his parents with financial matters. The Herrick Laboratories collected enough funds to cover their airfare.

Lei was honored at the Purdue University Golden Taps Ceremony on October 24 at 9:00 p.m. The Purdue Bell Tower tolled once for each student being remembered and "Taps" was performed by a lone bugler. A friend brought white carnations for people to hold. At the conclusion of the ceremony, the flowers were given to Lei's parents who were able to attend.

The Purdue University Chinese Students and Scholars Association had a memorial service for him on Thursday, October 27 at the Purdue Village Community Center. Stuart Bolton was one of the people to give a eulogy.

Lei will be missed by not only by the Herrick family, but also by his friends and family in China.

Internoise 2005, August 2005 in Rio de Janeiro, Brazil



It was a very busy summer for Stuart (Bolton), Patricia (Davies), Bob (Bernhard) and Luc (Mongeau), culminating in August, just before the start of the Fall semester, with the International Institute of Noise Control Engineering's annual conference which was held this year in Rio. While they enjoyed the view of Copa Cabana beach looking towards Sugarloaf, and the weather was perfect, they did have a busy week. In addition to presentations of papers and session chairing, Stuart and Patricia gave one day short courses on Noise Control Materials and Sound Quality before the conference started, and Stuart was also one of the plenary speakers. Bob also participated in a tire-pavement noise workshop after the Internoise conference.

This was a beautiful location and the conference was very well attended from the first session to the last. It was exciting for them to experience first hand the strong interest in noise control in South America. Samir Gerges, the conference organizer, did a wonderful job looking after all the conference attendees, and the graciousness and kindness of all the people at the conference and in the city will be long remembered.

Contract and Grant Awards

(5/1/2005-12/31/2005)

3M General Offices, "3M," *S. Bolton*

American Concrete Pavement Association (ACPA), "Investigation of Methods to Produce Quieter PCC Pavements by Grinding and Imprinting Surface Texture," *R. Bernhard*

Army Research Office, "Real-time Impact Load and Damage Identification in Rocket Motor Casings Using Blended Passive and Active Sensing and Data Analysis," *D. Adams*

ASHRAE/Carrier, "Willis Carrier/ASHRAE Fellowship," *J. Braun*

Auburn University/FAA, "FAA ACER Project 8: Decontamination," *Y. Chen*

Bowling Green State University, "Phonatory Aerodynamics," *L. Mongeau*

Copeland Corporation, "R410A Enthalpy Measurements in the Liquid Sub-cooled Region," *J. Braun*

Cummins Engine Company, "Determining the State of a Diesel Particulate Filter," *P. Meckl*

Cummins Engine Company, "Sensing Strategies for the Charge Handling System," *P. Meckl*

Electro Industries Inc., "Electro-pump for Residential Heating and Cooling Applications Phase II: Construction and Simulation of Bread Board Heat Pump System," *E. Groll*

Exa Corporation, "Aerodynamic Noise," *L. Mongeau*

Federal Aviation Administration, "Low Frequency Noise Study," *L. Mongeau*

Federal Aviation Administration, "FAA/NASA Center of Excellence: Project 8, Tasks 8.6 and 8.7: Perceptual Attributes of Supersonic Aircraft Noise and Their Relationship to Annoyance, Amendment 11," *P. Davies*

Federal Aviation Administration, "Perform Research as Part of the FAA Center of Excellence for Airliner Cabin Environment Research (Projects 6 and 7)," *Y. Chen*

Federal Aviation Administration, "2.2, Measurement, Metrics and Health Effect of Noise Determination of the Best Level - BSED Metric," *P. Davies*

General Motors Foundation, "GM Resident Engineer Research Support," *D. Adams*

Honeywell, "Development, Implementation, and Deployment of Automated Fault Detection and Diagnostics for Vapor Compression Equipment," *J. Braun*

Intel Corporation, "Development of a Miniature-Scale Refrigeration System for Electronics Cooling Phase I: Proof-of-Concept," *E. Groll*

John Deere Construction and Forestry Division, "Testing of Sound Quality of Tonal Noises in Earth Moving Machinery," *P. Davies*

Lawrence Berkeley National Lab/Department of Energy, "Demand Shifting with Building Mass," *J. Braun*

LG Electronics, "Modeling and Testing of a Twin Rotary Compressor," *E. Groll*

Lord Corporation, "Prognostics and Health Monitoring," *D. Adams*

Multisponsored, "Cooling Technologies Research Center," *E. Groll*

Multisponsored, "Integrated Sension and Diagnostics for Product Health Management of Wire Harnesses and Connectors in Gas Turbine Engines," *D. Adams*

NASA, "Graduate Student Research Program," *D. Adams*

NASA, "Minimizing Equivalent System Mass for a Regenerative Life-Support System by Optimizing Kinetics and Energetics of Major Bio-Transformations," *G. Chiu*

NASA, "Indiana Space Grant Consortium/Purdue First Program," *G. Chiu*

National Science Foundation, "CT-ISG: Printed and Sensor Forensics," *G. Chiu*

NIH, "Fluid-Structure Interactions wihtin the Human Larynx/UTSW SUB," *L. Mongeau*

NIST, "Guidelines and Demonstratiaon of Coupling Contam with CFD0-C Program (Phase III)," *Y. Chen*

NIST, "ME 413 Class Project," *L. Mongeau*

PHS-NIH National Institute for Deafness, "Communication Disorders, Fluid-Structure Interactions within the Human Larynx," *L. Mongeau*

Purdue Research Foundation, "Analysis of Miniature Scale Diaphragm Compressors for Electronic Cooling Applications," *E. Groll*

TDC Partners, Ltd., "Investigation of Methods to Produce Quieter PCC Pavements by Grinding and Imprinting Surface Texture," *R. Bernhard*

Trask Trust Fund, "Development of a Virtual Refrigerant Charge Level Gauge," *J. Braun*

U.S. Army TACOM, "Development and Deployment of a Wheel End Spindle Crack Detection Methodology," *D. Adams*

VIPAC Engineers and Scientist Limited, "Sound Quality of HVAC/Building Noise," *P. Davies*

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Qinyan Chen, James E. Braun, and David R. Tree were named as ASHRAE Fellows at the January 2006 Winter ASHRAE meeting. Pictured left to right are Yan Chen, Jim Braun, Lee Burgett (ASHRAE President), and David Tree.