



newsletter

Ray W. Herrick Laboratories

Purdue University, West Lafayette, IN 47907-2031

<http://www.engineering.purdue.edu/Herrick>

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50th Birthday Celebration

On July 18th and 19th, just after the compressor and refrigeration conferences, we celebrated the 50th birthday of the Herrick Laboratories. The summer birthday party was great fun. Many graduates of the Herrick Laboratories and their families, particularly ones from the early days of the laboratories, returned to reminisce about the old days and share stories of their time at the labs. Of course the festivities included an open house. Students gave tours of the laboratories to the alumni and guests and shared information about current research activities. Students



also gave tours of other campus facilities and the local area.

Friday evening began with a casual dinner on the State Street lawn. A local acoustic group, the Woodstove Flapjacks String Band, provided music

(<http://woodstoveflapjacks.com/>). They play at the annual Fiddlers Festival in Battleground (the next festival, the thirty-sixth, will be June 26-28, 2009) and also regularly upstairs at the Lafayette Brewing Company which has become a regular music venue for local bands. There were games for the children and adults. Bache balls entertained some, while others tossed a football, and still others were challenged by a game called "Ladder Balls." People ate, relaxed, talked with friends, and listened to the music.

On Saturday, activities included free time to visit with friends, simply walk the campus, tours of new buildings, and rides on the Boilermaker Special around campus and through the downtown area. A



sudden afternoon cloud burst didn't dampen spirits or stop the festivities for long. The Boilermaker Special was dried off quickly and was ready to go. The celebration ended with a formal dinner at the Elks Country Club on Saturday evening. Jevan Furmanski, the great-grandson of Bill Fontaine, was the featured speaker. Jevan graduated from Purdue with a degree in Mechanical Engineering. Ray Cohen, retired Director of the laboratories, spoke about his time at the labs and his memories of students and events while he was here. Bob Bernhard, previous Director, spoke about the laboratories impacted him and how he is incorporating lessons learned at the laboratories into his current position at Notre Dame. Other speakers included John Sanderson and Patricia Davies who spoke about the future of the laboratories and the plans for a new building.

State Representative Sheila Klinker was invited to attend; however, a previous engagement prohibited her from attending. Not long after the birthday celebration, an official proclamation arrived from the State of Indiana, which read, "Be it hereby known and proclaimed that the Ray W. Herrick Laboratories are commemorated upon their 50th Anniversary 1958-2008. Thus, as members of the One Hundred Fifteenth Indiana General Assembly, we would like to acknowledge the Ray W. Herrick Laboratories on this joyous occasion with best wishes for future successes." It was signed by B. Patrick Bauer, Speaker of the House of Representatives and by Sheila J. Klinker, State Representative.

Thank you Ray Herrick and Bill Fontaine for the laboratories—reaching our 50th birthday is a testament to the great vision that you and Frederick Andrews had when you started the laboratories.



Postscript: We received many emails from former Herrick Laboratories students who couldn't attend, one arrived just recently from Percy Wang (Ph.D. 1995). Percy sent us a link to twelve songs that he had recorded for the Salvation Army in Detroit during the 2003-2004 holiday season (<http://www.imeem.com/colorviolin>). Many of Percy's fellow students in the 1990s will recall his musical performances at many of the laboratory social events. Once again, Percy brings some joy to us all!

Jevan Furmanski, great-grandson of Bill Fontaine, the first Director of the laboratories.

Industrial Advisory Committee Meets

The Industrial Advisory Committee (IAC) met on Thursday, October 30 and Friday, October 31. The Thursday afternoon session met at the Kepner Building in Lafayette to showcase the research activities of Doug Adams and Monika Ivantysynova. Due to expanding research requirements on some larger scale structures that we could not even get into the Herrick Labs barn or its wings, a new facility in Lafayette was leased in the middle of 2008. Doug Adams moved his research to the new facility in the summer and joined Professor Monika Ivantysynova's research group who occupy the other part of the building. This building is located on McCarty Lane east of US 52. For those of you who were gardeners while at the laboratories, the Kepner building is very close to Bennett's Greenhouses.

Terry Manon, Patricia Davies, Doug Adams and Monika Ivantysynova welcomed the committee members. After an overview of Kepner activities presented by Doug Adams and Monika Ivantysynova, the committee toured the facility and saw experimental demonstrations given by some of the graduate students. Thursday evening ended with informal dinners hosted by Herrick faculty members at various locations throughout the Greater Lafayette area. Many went to Bruno's for pizza. For those of you who have not been back to Lafayette for some time, this restaurant is still run by Bruno's family in a location very close to where the old chalet used to be, at the intersection of SR 26 and SR 43. Bruno died a couple of years ago and his wife died this year, but his children Orlando, Tina and Bruno Jr. still run the restaurant. (See <http://www.brunodough.com/subpage/aboutus/history.html> for more information)

On Friday morning there was the State of the Laboratories given by the Director (Patricia Davies). We have had another very successful year with research expenditures similar to last year. The number of graduate students has been constant at around 70 or the past few years, but gradually the number of Ph.D. students vs. M.S. thesis students has been growing, a reflection of the direct-to-Ph.D. program that ME now offers. About half of the graduate students are from the US and the others from around the world: e.g., China, Korea, Europe, India, Pakistan and South America. Over the years we have seen a gradual increase in the number of women students and currently 14 of our students are women (19%). We continue to have a number of visitors from overseas: faculty, post-docs, graduate and undergraduate students. We also have a lot more undergraduates at the laboratories helping on research projects, particularly in the summer when Purdue Engineering's SURF and the NSF's Research Experiences for Undergraduates (REU) programs provide some funding for undergraduate research projects. See <https://engineering.purdue.edu/Engr/Research/SURF/> for more information on the SURF program.

An update on the Phase I fund raising for the new building was given as well as an overview of the draft plans for the entire new laboratory, which you may recall will result in a doubling of existing research space and will itself be set up to do studies on building efficiency and occupant comfort and productivity (see page 10). In the spring and summer, Profs. Jim Bran and Patricia Davies served on a search committee to find faculty to join the new Architectural Engineering Program at Purdue and three of the four new hires into that program, all of whom work on aspects of energy efficiency in buildings, gave presentations at this IAC. The fourth architectural engineering faculty hire is Herrick alumnus Travis Horton, who will be joining Civil Engineering at Purdue in January 2009. Civil engineering professor Judy Liu, who chaired the search committee, gave an overview of the plans for the program and this was followed by presentations by the new architectural engineering faculty. Hongxi Yin gave a presentation on his vision for sustainable buildings, Ming Qu described her Ph.D. research at Carnegie Mellon on solar energy for space heating and cooling, and Thanos Tzempelikos, a graduate of Concordia, described his research on lighting and advanced building envelopes. There is a lot of synergy

between the research of the new faculty and the research at the Herrick Laboratories and we look forward to many fruitful collaborations with them both in teaching and research, as well as in the planning and building of the new Herrick building. Also, welcome back to Purdue, Travis!

The morning presentations were followed by the graduate students' poster show. This year we got a bit behind schedule but made it to lunch only 20 minutes late. As usual, the graduate students hosted individual committee members during lunch. The poster show and lunch is always one of the highlights of the meeting for the committee members, who also liked the demonstrations done by students at the Kepner Building. So for next year, we are examining the feasibility of doing a combined poster show with demonstrations.

In the afternoon, the committee and faculty attended the three breakout sessions. The first was focused on New Building Design, Handling of "In-Kind" Contributions and a Research Center Proposal that Jim Braun and Yan Chen are leading. The university architect, Larry Fusaro, and John Sanderson one of the ME Directors for Development also attended. We have been working closely with Larry's team on the plans for the new laboratories. Because many of our supporters, including alumni, work in building related industries, there is a potential of in-kind contributions which would help considerably in defraying some of the costs of building of the new facilities. Larry helped clarify the process and timetable for handling those types of contributions. Yan and Jim are also assembling a team of industry supporters for the center proposal which will be focused on technology and science for the design and running of advanced buildings and spaces that are energy efficient, environmentally friendly, comfortable, healthy and productive. The second breakout session: Evaluating Technology Transfer Effectiveness and the Impact of the Laboratories came about because of a contact made with the laboratories by an economics graduate student, Tannista Banerjee who is studying university-industry interactions. She is interested in understanding the nature of the interactions, which form of technology transfer activities is more beneficial for, e.g., the Herrick Laboratory and particular client companies, and whether this form is a function of the type of company sponsoring the research. The third breakout session was focused on the IAC Membership and Transitions, Mission and Goals. From this discussion a list of the numerous ways in which IAC members can participate and help the laboratories was formulated. This will be particularly beneficial for people who are new to the community. The handling of membership transitions and the initiation of new members was also discussed.

After a summary of each of the breakout sessions, the IAC discussed what they had learnt throughout the day in a closed session. This was followed by a feedback meeting with the Director and the business part of the meeting closed at 5:30pm. Many thanks to our IAC members for their dedication to the laboratories, their advice and support. The IAC meeting is a highlight for all the students, faculty and staff who work at the laboratories.

Friday evening ended with a dinner at Jane's Gourmet Deli and Catering. Jane's is a very successful Lafayette business owned and run by Jane Mudawar who incidentally is the wife of ME heat transfer professor Isaam Mudawar. Because it was Halloween evening, Jane planned a Celtic dinner and she also invited a local musical couple who played and sang some Celtic tunes. On Saturday morning, Patricia Davies and Stuart Bolton graciously opened their home to the members of the committee for a brunch prior to the Michigan football game which Purdue won 48 to 42. Go Boilers. The only problem with scheduling the IAC on Halloween was that a couple of our dedicated parent members couldn't come because they were out in their neighborhoods getting candy with their children! So next year, we'll try to avoid the holiday.

2008 Purdue Conferences

—Eckhard A. Groll

Overview

The 19th International Compressor Engineering Conferences and the 12th International Refrigeration and Air Conditioning Conference took place July 14-17, 2008 on the campus of Purdue University in West Lafayette, Indiana. The attendees enjoyed a variety of social events during the conferences, including the opening night reception sponsored by LG Electronics, Inc., the Tuesday luncheon sponsored by Danfoss, Inc., and the steak barbeque sponsored by Emerson Climate Technologies, Ohio. Monday's breaks were sponsored by Shanghai Hitachi Electrical Appliance Co., Ltd. and Tuesday's breaks by The Trane Company.

Distinguished Service Awards were given to Jack Sauls of The Trane Company and George Gatecliff of Tecumseh Products, Inc. for their years of service on the conference advisory committee and their dedication to developing and presenting short courses.

The Compressor Engineering Conference included many sessions on specific compressor technologies (reciprocating, rolling piston, scroll, screw, centrifugal, and linear compressors) and issues related to compressor design and reliability (noise control, vibrations, gas pulsations, lubrication, wear, valves). In addition, there were several sessions that focused on new and existing applications of compressor technologies, including uses in transcritical carbon-dioxide cooling cycles. **The Refrigeration and Air Conditioning Conference** covered a wide range of topics, including transcritical carbon-dioxide and other novel refrigeration cycles, heat transfer/exchanger issues, system modeling (steady-state and transient), heat pumps, and specific applications in industrial refrigeration, supermarket refrigeration, and automotive air conditioning.

Statistics

Total conference attendance from approximately 20 countries 529
Total short course attendance 79

Papers from 26 countries published in the combined CD-ROM proceedings 254
Compressor Engineering Conference 108
Refrigeration and Air Conditioning Conference 146

Authors published in the program 595
Compressor Engineering Conference 262
Refrigeration and Air Conditioning Conference 353

Plenary Sessions

- **Keynote address:** S. Forbes Pearson, Star Refrigeration Limited, Scotland "Development Trends and Possibilities in Industrial Refrigeration".
- **Tuesday plenary:** Dr. Peter Egolf, University of Applied Sciences of Western Switzerland, Institute of Thermal Sciences, Switzerland "Magnetic Heating, Refrigeration and Power Conversion".
- **Wednesday plenary:** Professor Denis Clodic, ARMINES, France "Latest HVAC&R Development Trends in European Response to Imminent HFC Regulations".
- **Thursday plenary:** Professor Ruzhu Wang, Shanghai Jiao Tong University, China "Trends and Perspectives of China HA-VAC&R".

The final program, keynote talk, plenary talks and the technical papers are on the CD ROM proceedings or in the printed proceedings and are available at <http://www.ecn.purdue.edu/Herrick/Events/>.

Short Courses

Two short courses were conducted prior to the 2008 conferences: 1) Hands-On Modeling and Computer Simulation of Gas Pulsations in Reciprocating Compressors and 2) Update on Natural Refrigerants. Approximately 80 people participated in these short courses.

2010 CONFERENCES & SHORT COURSES

<http://engineering.purdue.edu/Herrick/Events>

July 10-11, 2010 Short courses will precede the conferences.
July 12-15, 2010 Purdue Compressor Engineering Conference and the Refrigeration and Air Conditioning Conference

**Special thanks to Ginny Freeman for her dedication and hard work
all of which help makes these conferences a great success.**

Radical engine redesign would reduce pollution, oil consumption

—Emil Venere, University News Service

Researchers have created the first computational model to track engine performance from one combustion cycle to the next for a new type of engine that could dramatically reduce oil consumption and the emission of global-warming pollutants.

“We’re talking about a major leap in engine technology that could be used in hybrid cars to make vehicles much more environmentally friendly and fuel stingy,” said Gregory M. Shaver, an assistant professor of mechanical engineering at Purdue University.

A key portion of his research, based at Purdue’s Ray W. Herrick Laboratories, hinges on designing engines so that their intake and exhaust valves are no longer driven by mechanisms connected to the pistons. The innovation would be a departure from the way automotive engines have worked since they were commercialized more than a century ago.

In today’s internal combustion engines, the pistons turn a crankshaft, which is linked to a camshaft that opens and closes the valves, directing the flow of air and exhaust into and out of the cylinders. The new method would eliminate the mechanism linking the crankshaft to the camshaft, providing an independent control system for the valves.

Because the valves’ timing would no longer be restricted by the pistons’ movement, they could be more finely tuned to allow more efficient combustion of diesel, gasoline and alternative fuels, such as ethanol and biodiesel, Shaver said.

The concept, known as variable valve actuation, would enable significant improvements in conventional gasoline and diesel engines used in cars and trucks and for applications such as generators, he said. The technique also enables the introduction of an advanced method called homogeneous charge compression ignition, or HCCI, which would allow the United States to

drastically reduce its dependence on foreign oil and the production of harmful exhaust emissions.

The homogeneous charge compression ignition technique would make it possible to improve the efficiency of gasoline engines by 15 percent to 20 percent, making them as efficient as diesel engines while nearly eliminating smog-generating nitrogen oxides, Shaver said.

This improved combustion efficiency also would reduce emission of two other harmful gases contained in exhaust: global-warming carbon dioxide and unburned hydrocarbons. The method allows for the more precise control of the fuel-air mixture and combustion inside each cylinder, eliminating “fuel rich” pockets seen in conventional diesel engines, resulting in little or no emission of pollutants called particulates, a common environmental drawback of diesels.

The variable valve actuation system makes it possible to “reinduct,” or reroute a portion of the exhaust back into the cylinders to improve combustion efficiency and reduce emissions. The system also makes it possible to alter the amount of compression in the cylinders of both conventional and HCCI engines and to adjust the mixing and combustion timing, allowing for more efficient combustion.

“Variable valve actuation and HCCI would help to significantly reduce our dependence on oil by enabling engines to work better with ethanol and biodiesel and other alternative fuels,” Shaver said. “But accomplishing this is going to require a strong effort in several research areas—a commitment of funding, people power, industrial involvement and academic involvement.”

In HCCI, the “charge,” or fuel-air mixture, is homogeneous, meaning it is uniform. Adding the reinducted exhaust both dilutes and increases the temperature of this air-fuel mixture before compression. The process also allows for a uniform



Researchers at Purdue’s Ray W. Herrick Laboratories are developing fuel-flexible combustion control strategies that enable highly efficient, ultra-low emission combustion of both conventional and domestically available alternative diesel fuels, including biodiesel and coal-derived liquid fuels. Gregory Shaver, at right, an assistant professor of mechanical engineering, works with graduate students Gayatri Adi, left, and Mike Bunce to prepare for biodiesel testing with a 2007 Cummins turbo-diesel engine. Graduate student Karla Stricker, in window at right, monitors data acquisition. (Purdue News Service photo/David Umberger)

Radical Engine Design (continued)

“auto ignition,” or combustion without the need of a spark, at a lower compression than normally required for diesel engines, reducing engine wear and tear.

Inside the cylinders of ordinary internal combustion engines, there is a large temperature difference, or gradient, between portions of the air-fuel mixture that have been ignited and portions that are still not burned. The homogeneous fuel-air mixture and reinducted exhaust work together to eliminate this temperature gradient during the auto-ignition, which decreases the overall combustion temperature. Decreasing the combustion temperature is a key step in dramatically reducing nitrogen oxides.

A major challenge will be learning how to automatically adjust valve motions and fuel injection to match changes in operating conditions dictated by factors such as a vehicle’s varying speed, how much weight it is carrying and what type of fuel is being used.

Engines incorporating HCCI will use sensors to monitor an engine’s performance, providing crucial data needed to dynamically alter the valves’ timing. Controlling the combustion process via variable valve actuation will require specialized software algorithms being developed by the Purdue researchers.

“We will use feedback control, where you have sensors that provide data from the engine and an algorithm to precisely control the valves,” Shaver said.

Shaver, his colleagues and students are in the process of building a one-of-a-kind multicylinder engine design with “fully-flexible variable valve actuation,” which will allow the study of HCCI and alternative fuel combustion, he said.

He was the lead author of a research paper honored with the 2006 Rudolf Kalman Paper Award for the best paper published in the *Journal of Dynamic Systems, Measurement, and Control*. The award was issued last year during the International Mechanical Engineering Conference and Exposition in Chicago. The paper detailed findings related to a new mathematical model to help develop the homogeneous charge compression ignition system.

In order for the system to work, it is critical to track changing engine performance from one combustion cycle to the next. The mathematical model Shaver has developed is the first of its kind to precisely track this dynamic cycle-to-cycle performance and other data.

The highest efficiency would be realized by combining

HCCI technologies in hybrid vehicles that use an electric motor in addition to an internal combustion engine.

“It’s essential to continue research on multiple fronts, including work to tackle problems associated with fuel cells and hybrid systems and understanding how to incorporate the advanced combustion engines on hybrid powertrains,” he said.

U.S. petroleum imports are predicted to increase about 35 percent by 2030. At the same time, the transportation-related emission of carbon dioxide is expected to rise by about 35 percent in the United States.

The authors of the paper published last year in the *Journal of Dynamic Systems, Measurement, and Control* were Shaver; J. Christian Gerdes, an associate professor of mechanical engineering at Stanford University; Matthew J. Roelle, a graduate student at Stanford; Patrick A. Caton, an assistant professor at the U.S. Naval Academy; and Christopher F. Edwards, an associate professor of mechanical engineering at Stanford.

Research sponsors include Cummins Inc., Purdue’s Energy Center, and the Purdue Research Foundation.

Shaver’s research team at Purdue includes graduate students David Snyder, Gayatri Adi and Michael Bunce, undergraduate students Armando Indrajana, Elena Washington, Justin Ervin and Matt Carroll.



Greg Shaver and Dave Snyder discuss implementing a variable valve actuation system on a Cummins diesel engine.

Herrick Labs News

Obituary

William A. Hames Jr., 86, of Evansville, Indiana died at 2:29 p.m. Saturday, July 5, 2008, at Deaconess Hospital. William was born March 24, 1922, in Decatur, Alabama. He graduated with honors from Purdue with a Bachelor's Degree in Mechanical Engineering. He served as a member of the Herrick Laboratories' Industrial Advisory Committee from 1958 to 1994 and attended the meetings regularly. He worked in the Product Engineering departments at International Harvester and Whirlpool in several capacities, including Director of Advanced Engineering.



Family photo of Bill Hames.

He is survived by his wife of 60 years, Mildred (Sickman) Hames, of Evansville; his children, Kris Crismore and her husband, Larry, of Decatur, Indiana, and William "Skip" Hames III and his wife, Vicky, of Evansville; three grandchildren, Nick Rieth and his wife, Mandy, of Decatur, Indiana, Katie Rieth, of Decatur, Indiana, and Meredith Hames, of Evansville; and a great-grandson, Jackson Rieth, of Decatur, Indiana.

Funeral services were held at 1 p.m. Tuesday, July 8, 2008, at Boone Funeral Home East Chapel with the Rev. John Schroeder and the Rev. Robert Walker officiating. Burial was at Sunset Memorial Park Cemetery.

If you would like to send a condolence to the family or a special memory of Bill, please send it to Bill Hames, % Herrick Laboratories at the address on the back of the newsletter, and it will be forwarded to his family.

Ray Cohen Remembers Bill Hames

Bill Hames died on July 5th in Evansville, IN. He was a great supporter of the Herrick Laboratories and served on its Industrial Advisory Committee for many years—possibly more than any other member of the committee. That period of time included a number of years as Chairman when I was the Director. The Herrick Labs were a big part of his life, as his wife, Millie, told me after his death. I already knew that because he was always ready to do anything required and made more trips between Evansville and Lafayette than we can count or remember.

Bill had many friends among those who also attended the Advisory Committee meetings. But I think the best friends he made on his many visits to the Labs were the faculty, staff and students he worked with, especially those who worked on projects sponsored by his company—Whirlpool. Whirlpool hired many graduates of the Labs, certainly influ-

enced by their contact with Bill.

Bill had a strong influence on the direction of the Laboratories and on the faculty, staff and students. I was certainly grateful for his counsel over the years of our contact, and I cherish his and Millie's friendship. Many of us have missed him after he retired from the Advisory Committee. He will surely live on in our memories.

Memories of Bill Hames

David Tree

I remember Bill and his wife Mildred from their many years of service to Purdue. When I first joined Herrick Labs, Bill was a member of the Herrick Labs Advisory Committee. Bill and his wife were very fond of Professor and Mrs. Fontaine. Whenever they came to West Lafayette, they always visited the Fontaines and when possible they took Bill and Mildred to dinner.

Bill was a great supporter of Herrick Labs. I think it is fair to say that without his help on the advisory committee, Professor Fontaine would have had a much harder time establishing the labs. Bill was a great supporter of Purdue University. He loved to watch Purdue basketball. When I first knew Bill there was a Purdue basketball player by the name of Ford. He played high school basket in Evansville and Bill always wanted to tell you that he and Ford graduated from the same high school and both played basketball there. It was a pleasure to know William and Mildred Hames. He taught me a great deal on how industrial companies worked, which was a great help in my research at Herrick and my work for Sponsored Programs Services.

Where are They Now?

Zhao Zhang (MSME 2005; Ph.D. 2007) accepted a position in New York, New York with Hatch Mott MacDonald Group in February. He is working on fire and life safety modeling and analysis in various structures. He writes: *"I could not believe I have been kept busy from the very first day of my work here."*

I hope all of you are doing well and please do keep in touch. Since the company restricts our accessing gmail at work, please contact me at my work email for business and/or urgent matters."

If you'd like to contact Zhao, here are his e-mail addresses: Zhao.Zhang@hatchmott.com or z Zhang.zhao@gmail.com.

Erratum

Pat Brandyberry (retired Herrick staff member) lives by herself in Lafayette and has fond memories of her time at the Herrick Laboratories. She said she enjoyed her job and would still be working here if circumstances had allowed. She enjoys the Newsletter and called after the last one was mailed saying we

Herrick Labs News (Continued)

had misidentified a former Herrick staff member. In the picture below, the first person on the left is Don Aynes, not Leonard Cooper. Thank you, Pat, for keeping us on our toes.



Patrick Cunningham (MSME 2000, Ph.D. 2006) is an Assistant Professor of Mechanical Engineering at Rose-Hulman Institute of Technology in Terre Haute, Indiana. Patrick sent us an e-mail about a recent trip. As he put it, “We just travelled to Ethiopia and back November 8th to the 15th returning with two wonderful children. I am attaching our first family photo taken at the zoo in Addis Ababa, Ethiopia. Hana Marie is our 4 year-old daughter and Bereket Luke is our 1 year-old son. They are biological brother and sister so we were able to keep them together, which is quite a blessing!”



This is the first Cunningham family photo taken at the zoo in Addis Ababa, Ethiopia.

Faculty Awards and Promotions

In April, **J. Stuart Bolton** was one of two faculty members recognized with a teaching award for distance learning courses. One faculty member was chosen for teaching large distance learning classes and another was chosen for teaching small

distance learning classes. This was the first year for the award so Stuart was one of the first recipients. The award was from Engineering Professional Education, and they plan to present the award annually. The nominees were chosen by recommendations of the nearly 900 students to enroll in distance learning Professional Education classes annually.

Yan Chen was appointed the “Chang Jiang Chair Professor” by China’s Ministry of Education in recognition of his contributions in the field of Heating, Ventilating, and Air Conditioning. The Chang Jiang Scholars Program was jointly established by China’s Ministry of Education and the Li Ka-Shing Foundation in 1998. The main objective of the program is to further improve China’s standard of education and intellectual competitiveness by rapidly developing Chinese research institutions through the engagement of Chang Jiang Scholars. It is the highest recognition program from the Ministry of Education. The appointments are made based on nation-wide competition among the nominees by Chinese universities. The chair professors conduct collaborative research in various Chinese universities for short terms. Professor Chen will have frequent visits to the Tianjin University in China during the next three years.

George Chiu and **Peter Meckl** were promoted from Associate Professors to Full Professors. The promotions became effective at the beginning of the 2008-09 academic year.

George Chiu agreed to take on the faculty/academic aspects of directing two important activities in the School of Mechanical Engineering—those of Professional Practice (co-op) and Global Initiatives. It remains strategic to link these areas as the global professional environment becomes increasingly dominant.

George takes over for Eckhard Groll who did an excellent job in this capacity for the past three years, and has now moved on to a similar position at the College level. Eckhard, with the help of Jerry Matthews and others, has helped: keep the Mechanical Engineering co-op enrollment strong; sustain the percentage of students graduating BSME with 3 or more months of engineering internship experience at about 90%; and grow the number of Mechanical Engineering students involved in credit bearing global experiences last year to 64 (on a number and percent basis this puts the School of Mechanical Engineering at the very top of in the College of Engineering).

Eckhard Groll accepted an offer to become the director of the Office of Professional Practice effective August 1, 2008. Growing experiential learning programs is one of the cornerstones of the developing strategic plan in the College of Engineering.

He was also inducted into the **Book of Great Teachers**, which honors outstanding teaching faculty who have demonstrated sustained excellence in the classroom.

The August 28 induction, which occurs once every five years,

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took place from 3:30-5:30 p.m. in the North Ballroom of the Purdue Memorial Union. Purdue President France A. Córdoba and Provost Randy Woodson recognized the honorees.

To be included in the Book of Great Teachers, professors and former professors must have served on the Purdue faculty at least 10 years. Honorees include past recipients of university-wide teaching excellence awards and those nominated by students, alumni and colleagues.

“These professors are passionate about teaching and are making a difference in the lives of students both inside and outside the classroom,” Woodson said. “This honor reflects our commitment to excellence in teaching and the faculty that embody this every day.”

The book, a bronze and walnut wall display in the west foyer of the union, was first unveiled in 1999 with 225 current and former faculty members listed on the book.

Student Awards

Tyler Dare (current Ph.D. student) received the 3M E-A-R Acoustics Scholarship at the Institute of Noise Control Engineering’s NOISE-CON 2008 Conference .

Feng Liu (current Ph.D. student) was named as one of the two recipients of the 2008 Raymond Davis Scholarship from the Society of Image Science and Technology (IS&T). Feng received the award at the 2008 International Conference on Printing Technology at Pittsburg in September.

Sarah McGuire (current Ph.D. student) was selected as a 2008 Amelia Earhart Fellowship recipient. The fellowship is awarded to women pursuing doctoral degrees in aerospace-related science and engineering programs.

Taewook Yoo, (MSME 2003, Ph.D. 2008) received the Best Student Paper award at the Institute of Noise Control Engineering’s NOISE-CON 2008 Conference. He was awarded \$1000 for the paper titled “Absorption of Finite-Sized Microperforated Panels with Finite Flexural Stiffness at Normal Incidence.”

Graduations

Stefan Bertsch (Ph.D., August 2008), *Refrigerant Flow Boiling in Microchannel Evaporators*. Stefan is teaching at the Interstate University of Applied Sciences of Technology Buchs NTB in Switzerland.

Hao Jiang (Ph.D., December 2008), *Material Damage Modeling and Detection in a Thin Metallic Sheet and Sandwich Panel Using Passive Acoustic Transmission*. Employment information not yet confirmed.

Anup Kulkarni (MSME, August 2008), *Investigation of High Efficiency, Ultra-Low Emission, Advanced Mode Diesel Combustion in a Validated, Flexible and Computationally Efficient Whole Engine Model*. Anup accepted a position, effective August 11, as a Senior Associate Engineer with Caterpillar in Lafayette.

Jeffrey T. Peters (MSME, August 2008), Non-thesis: *Noise Control in Hydraulic Systems*. Jeffrey is working for Honeywell Aerospace in Phoenix, AZ.

Emily Prewett (MSME, May 2008), Non-thesis: *Modeling and Identification of Damage in Composite Materials*. Emily is working for Boeing Company in Seattle, WA.

Abhijit Sathe (Ph.D., August 2008), *Miniature-Scale Diaphragm Compressor for Electronics Cooling*. Abhijit is working for Parker Hannifin Corp. in New Haven, IN.

Pranati Surve (MSECE, August 2008), *Diesel Particulate Filter Diagnostics Using Correlation and Spectral Analysis*. Pranati took a position with Cummins, Inc. in Columbus, IN.

Taewook Yoo (Ph.D., August 2008), *The Modeling of Sound Absorption by Flexible Micro-Perforated Panels*. Taewook is working for E-A-R, a 3M Company in Indianapolis, IN.

Zhipeng Zhong (Ph.D., August 2008), *Combined Heat and Moisture Transport Modeling for Residential Buildings*. Zhipeng took a position with Steven Winter Associates in Norwalk, CT.

Engagements



Tyler Dare (current student) and Jennie Brencic were engaged on Friday, August 22. No date has been set. They do know the service will be in Brookfield, IL. Stay tuned for more details.

Anup Kulkarni (MSME 2008) and Simantini Kukade are planning a December 21st wedding in Pune, India. The couple plan to return to the United States in January.

Chintan Shah (MSME 2008) and Kosha Desai were engaged on June 27. Their nuptials are tentatively planned for sometime next December. They are hoping to have the wedding in Mumbai (formerly known as Bombay), India.

Weddings

Carol Barker (retired Herrick staff member) and William R. Border were married on May 3 at the Trails by Ann Williams, the pastor of Fowler Presbyterian Church. They had a small wedding for

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family only, then a family dinner afterwards at the Trails. The happy couple honeymooned in Myrtle Beach for a week. Carol wrote in an e-mail, “Bill is a semi-retired dentist who lives in Lafayette but has a practice in Fowler, Indiana, where he sees patients two days a week. He obtained his bachelor’s degree at Purdue in chemistry and then followed with dental school at Indiana University (but states Purdue is where his loyalty lies). Carol plans to continue to work at Lafayette Savings Bank until the end of the year, then retire (really retire).” The couple requests no gifts, but says cards are welcome.

Please send them to the Herrick Laboratories, and we will gladly forward them.



Cathy Jones and Dean Edging (pictured left) were married on June 28 at the Cornerstone Baptist Church in Lafayette. A reception followed the service at the church. Cathy works in Building Services at the Labs and Dean Edging is employed

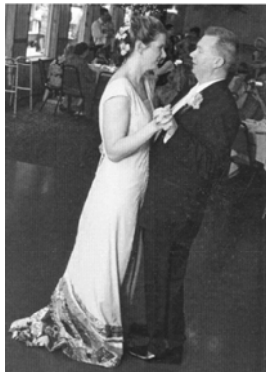
by Grounds and is assigned to the Labs. They took a week off work to celebrate. Bob Brown participated in the service as an usher. At least we think it was Bob—he was wearing a suit!

Greg Shaver and Erika Hensen were married on June 1. The couple had a private ceremony at the Purdue Horticultural Park with family members in attendance.

Janene Christensen (current graduate student) and David Silvers (photo right) were married on May 8 in Bountiful, Utah. They had a reception following the ceremony in North Salt Lake, Utah and a second one on May 10 in Dallas, Oregon.



Janette Jaques and Rick Meyer (both current students) were married on July 19. They’re a true Herrick love story because they met when the graduate students met to plan weekly volleyball. Their wedding was unique for another reason. Janette and her family made her wedding dress, and friends and relatives of the bride each contributed fabrics that became a section of the dress which Janette’s mother made. The pieces of fabric were put into a quilted short train curving around the back of the dress, which you can see on the photo at the left. The gown and the individual pieces were so special, the *Journal*



and *Courier*, the local newspaper, carried a special two-page spread about the dress.

Matt Vargo (current undergraduate student) and Crystal Lewis exchanged marriage vows on Saturday, September 20 at St. Lawrence Catholic Church in Lafayette. The reception was held at Stewart Center on Purdue’s campus. The two went to Indianapolis for the weekend. Crystal works in the Business Office in Electrical Engineering.

Bin Yao and Lan Zhong were married in China and came to the U.S. on October 3. Congratulations to all of the newlyweds as they begin their new lives together.

Births

Lorenz Hagenmeyer (MSME 2000) married Dorothea Dette in April 2006. Their son, Jonathan, was born in July 2007.

Larry Hollingsworth (MSME 1993) and his wife, Lisa, welcomed a baby girl, Lexie, born on December 10, 2007. She weighed 6 lbs. 14 oz and measured 19 inches long.

Rajani Ippili (MSE 2003) and his wife, Jyothi, are the proud parents of a daughter, Hasini, born on March 12, 2008.

Jun-Hyeung (Jay) Kim (MSME 2002, Ph.D. 2005) and his wife, Soo-Young Hong, welcomed a baby boy, Eje Kim, on June 25. The entire family is doing well.

Denny Yim (MSME 1995) and his wife, Jacqueline Po, had a baby boy. Hayen Yim was born on November 24 at 7:44 a.m. He weighed 6 pounds and 10 ounces. He was 19.5 inches long. Both baby and mother are doing great. Ethan now has a little brother to play with.

Anniversaries

Jim Hamilton (professor emeritus) and his wife, Phyllis, celebrated their 60th wedding anniversary on April 30. Congratulations, Jim and Phyllis!

Staff Changes

Two people have had career changes and left the Herrick Laboratories, **Debra Istwan** and **Donna Miller**. Debra Istwan was our account clerk. She accepted a job closer to her home, which was better for her and her family. After 17.5 years at the Herrick Laboratories, Donna Miller accepted a position in Biological Sciences in the Lilly Hall of Life Sciences. We congratulate both Debra and Donna on their new positions and wish them continued success.

Alumnus Completes \$11 Million Drive for New Herrick Building

—Emil Venere, Purdue University News Service

On September 15, Purdue University announced a \$2 million gift from mechanical engineering alumnus Gerald D. Hines, completing a drive to raise \$11 million for a project to expand the university's Ray W. Herrick Laboratories.

"The Herrick Labs has an impressive legacy of balancing the needs of industry, academics and basic research," said Purdue President France A. Córdova. "Now Purdue is going to ensure that legacy continues by providing more spacious and modern facilities for this important work."

The Herrick Laboratories were established in the 1950s with a grant from Ray W. Herrick, then CEO of Tecumseh Products Co., in Tecumseh, Michigan. Since then, about 600 Herrick students have completed graduate and doctoral degrees.

"Herrick Labs is a place where students learn about industry-relevant problems and contribute, through their research, to solving these problems," said Leah Jamieson, the John A. Edwardson Dean of Engineering and Ransburg Distinguished Professor of Electrical and Computer Engineering. "Herrick graduates are valued for their technical expertise and know-how for making products more efficient, more environmentally friendly and more people friendly."

The new facility will include the Gerald D. Hines Sustainable Buildings Technology Laboratory, which will focus on new building technologies and their impact on human behavior and productivity, said E. Daniel Hirleman, professor and William E. and Florence E. Perry head of the School of Mechanical Engineering.

Hines graduated in 1948 with a degree in mechanical engineering at Purdue. He moved to Houston after graduating from Purdue and went to work for a large national engineering company. In 1951 he joined Texas Engineering as a partner and then formed Gerald D. Hines Interests.

The Houston-based company is now one of the largest real estate firms in the world, with operations in the United States and 15 other countries.

"The Sustainable Buildings Technology Laboratory is a leading-edge concept that will have a great impact on helping our industry improve the energy efficiency of buildings and make them more environmentally friendly," Hines said. "I am pleased to be in a position to support this very important project."

The new Herrick building also will include the Perception Based Engineering Laboratory, funded by Ford Motor Company.

Ongoing research in the Perception Based Engineering Lab is led by Patricia Davies, director of the Herrick labs and a professor of mechanical engineering. The lab focuses on understanding factors contributing to occupant perceptions of quality, with projects on noise and sound quality, indoor air quality, thermal comfort, visual perception, and touch.



Gerald D. Hines, Purdue University alumnus and Herrick Laboratories' benefactor.

"The current building's infrastructure and utilities now limit the scope of research that we can do," Davies said. "Given the special-purpose facilities needed for much of our research, the expansion is a challenging endeavor."

The \$11 million raised for the project includes donations of \$3.5 million from alumnus Roger B. Gatewood, \$3 million from Ford Motor Company, and \$1 million apiece from the Herrick Foundation and Cummins, Inc.

The university currently is selecting an architect. The new building, currently planned to be located adjacent to Herrick south of State Street between Martin Jischke Drive and Russell Street, initially may encompass a total of 32,000 square feet and is expected to be completed by 2012. It will house offices and experimental facilities for more than 90 graduate students, 25 faculty, postdoctoral researchers and visiting researchers, as well as technical and administrative staff.

Another unit to be included in the new building is the Cummins Power Laboratory, funded by Cummins Engine Co. Research will focus on reducing the environmental impact and improving the efficiency of diesel and internal combustion engines and will include projects on renewable energy and hydrogen power.

"The wide scope of the research conducted at the laboratories will require demanding specifications for the new building, in particular, the need for acoustic and vibration isolation in various parts," Davies said. "Some areas will require background noise and vibration levels to be below human perception thresholds, and in these areas an ability to precisely control environmental parameters will be critical."

The offices and meeting rooms also will constitute a "living" laboratory that will help bridge the gap between new prototype technologies arising from fundamental research and conventional technologies used in new buildings.

"This will involve reconfigurable heating, ventilation and cool-

New Herrick Building (continued)

ing systems and building envelopes so that new concepts can be tried out in a realistic setting,” Davies said. “Actual energy efficiency, occupant comfort and productivity in a working building can be monitored and the information used to make refinements to proposed technologies. This will ensure much more successful and predictable implementation of new technologies in buildings.”

Advanced building designs will address issues including water conservation, using natural lighting and recycled materials, and other steps to conserve energy and resources.

“The overall concept behind the new Herrick labs is to go ‘beyond green,’” Davies said. “We will learn through research how to further increase energy efficiency and lower environmental impact and also integrate occupant comfort and productivity into building design objectives so that you design spaces that people actually want to be in. The living lab is important because we want to be able to demonstrate that concepts work and identify where the problems are so that they can be addressed.”

The Hines lab will be a leading incubator for sustainable building technologies.

Research associated with the Perception-Based Engineering Lab explores learning how people react to a product and their environment.

“If you are designing products that impact people, it makes sense to study how people perceive factors such as sound, vibration, temperature, lighting and other elements,” Davies said. “Then you can integrate human experience into the design of products.”

The new facility will enable us to study issues in a much more sophisticated way, so we could study sound and vibration together, or vision and noise, or we could look at productivity in a noisy, hot and humid environment and examine tradeoffs between thermal and acoustic comfort or air quality. We will look at the effects of the environment on the people working in them in terms of comfort, productivity and health, and we will couple our findings with engineering models to enable an integrated perception-based engineering approach to designing complex systems such as buildings and machines.”

There are still two phases of the new building that need to be funded. Your continued support is much appreciated. If you can help, please complete and return the form below to the Herrick Laboratories at the address on the back cover.

Ray W. Herrick Laboratories Building Fund Pledge Form

I pledge to give \$ _____ to the Herrick Laboratories Building Fund

Purdue Foundation will mail payment notices based on the schedule you determine is best for you. You will be able to pay with check or credit card.

Frequency of Payments: ___ Annually; ___ Semi-Annually; ___ Quarterly; ___ Monthly

Duration of Payments (years): _____ Beginning Date: _____

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Signature: _____ Date: _____

For naming options or more information contact:

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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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