



newsletter

Ray W. Herrick Laboratories

Purdue University, West Lafayette, IN 47907-2031

Fall 2006
Volume 13, Number 2

Familiar Faces Leave, New Faces Arrive

Luc Mongeau Moves to Canada

After 13 years at Purdue, Luc Mongeau accepted an offer on June 12 for a chaired position at McGill University in Montreal, Quebec, Canada. The offer was even more enticing because Luc was originally from Montreal and still has family there.

Of course no send-off would be complete without a reception. Luc's was on August 18 in the Hudelson Room. He received a painting with a scene from the Greater Lafayette Area by a local artist so he would remember his times in Indiana as good. He also received coffee mugs made by a local artist. His wife, Rose, was able to join him and participate in the festivities.

As with many faculty members, Luc's research is highly specialized. His research interests include interior aerodynamic noise in vehicles, turbo-machinery noise, thermoacoustic refrigeration, flow-induced sound and vibrations, and speech production.

Luc plans to visit Herrick on a monthly basis until his students graduate, his Purdue research projects are completed,

or his students are able to join him at McGill. We wish Luc the best of luck in his new venture.

Linda Tutin Retires

After working at the Ray W. Herrick Laboratories as a Secretary for more than 9 years, Linda Tutin decided to retire early and enjoy relaxing with her husband, David. The two of them left Lafayette on November 30 and moved to Florida.

Linda was promoted from a Secretary IV to a Secretary V when she accepted the position as the Herrick Secretary effective June 16, 1997. She became the heart of the labs and cared deeply about the people she encountered and vice versa. We all miss her very much.

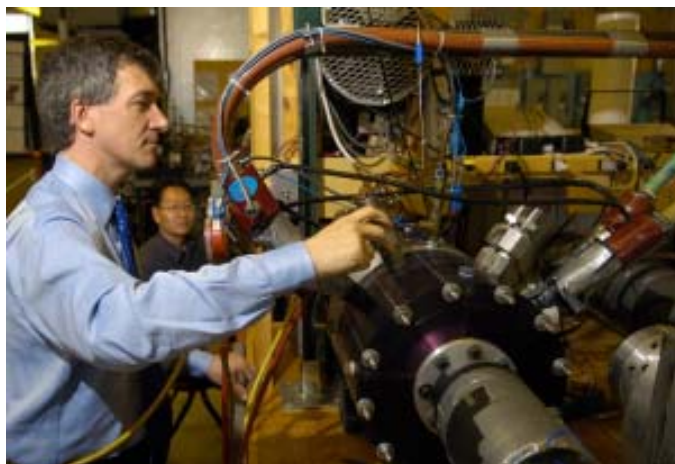


Linda's last work day at Herrick was on November 17. A reception was held in her honor in the Hudelson Room. As parting gifts, Linda received a digital photo frame and an afghan throw featuring a few Purdue buildings, like the Memorial Union. She also received a cash donation to assist with the expenses of moving to Florida. Several guests brought individual gifts. So many people came, there was a very long line-up for the food.

Most of the members of Linda's family were in attendance, including her two children, Jamie and Moni. Moni was accompanied by her husband, Paul, and their son, Henry, who is Linda's first and only grandchild at the moment.

If you would like to send Linda a congratulatory card or note, her address in Florida is:

37424 Lilly Bea Avenue
Zephyrhills, Florida 33541



Luc Mongeau researching a thermoacoustic cooler prototype. In the background is In-Su Paek (Ph.D., 2005), now a Postdoctoral Researcher for Luc.

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Purdue Part of New \$21 Million Fluid Power Energy Research Center

—Cynthia Sequin, Purdue University News Service



The National Science Foundation announced a \$15 million, five-year grant to support the new Engineering Research Center for Compact and Efficient Fluid Power. Industry partners will augment the funding with \$3 million, and seven universities involved in the center will contribute an additional \$3 million. The center will be based at the University of Minnesota Twin Cities campus, and

Purdue will house one of the center's research labs in its MAHA Fluid Power Laboratory, which is supervised by Monika Ivantysynova.

Fluid power is a \$33 billion industry worldwide. Industry areas include aerospace, agriculture, construction, health care, manufacturing, mining and transportation. Fluid-power technology encompasses most applications that use liquids or gases to transmit power in the form of pressurized fluid. The complexity of these systems ranges from a simple hydraulic jack used to lift a car when replacing a tire to sophisticated airplane flight control actuators that rely on high-pressure hydraulic systems.

"We are working to create the next generation of pumps and motors, which are the heart of each fluid power system," said Monika Ivantysynova, the Purdue MAHA Professor of Fluid Power Systems and a professor of mechanical engineering and agricultural and biological engineering. "We predict we can reduce the energy consumption of fluid power systems up to 30 percent by using a new generation of pumps, motors and new throttleless actuators. In the transportation sector alone, that is an annual savings of 100 million barrels of oil."

Other Purdue researchers working on the project are Steven Frankel, professor of mechanical engineering; and Steven Wereley, associate professor of mechanical engineering. Luc Mongeau is also one of the project researchers.

With help from the National Fluid Power Association, more than 50 companies have agreed to provide support for the research center. Seven of those companies have annual sales of more than \$500 million.

According to Monika, researchers at the center will study

ways to use fluid power more efficiently in off-road and on-road vehicles, in manufacturing and other areas, and also will work on completely new applications, like rescue and surgery robots. Each 10 percent improvement in the efficiency of current uses of fluid power in these industries would save about \$7 billion a year in U.S. energy costs. Researchers also will work to develop hydraulic hybrid passenger cars that are less expensive and more efficient than current electric hybrids. A 10 percent improvement in efficiency in national passenger car energy use would save about \$10 billion a year.

Another research center goal is to develop portable, wearable and autonomous fluid-power devices capable of operating for long periods of time without external energy sources. This technology could lead to new medical and rehabilitation devices and robots that could be used in rescue missions.

"We are creating compact and efficient fluid-power systems that can, for the first time, be used to power underwater exploration and robots that can remotely manipulate nuclear materials," Monika said. "These new devices can also be used for wearable or compact tools for home and industrial use."

In addition to research, the center will be involved in developing youth education programs, improving efforts to increase student diversity in engineering, designing internship and exchange programs for undergraduate and graduate students, and offering short courses and labs for industry workers.

Core universities involved in the Engineering Research Center are the University of Minnesota-Twin Cities, University of Illinois at Urbana-Champaign, Georgia Institute of Technology and Vanderbilt University. Outreach universities include the Milwaukee School of Engineering and North Carolina A&T State University. Outreach institutions include the National Fluid Power Association, Project Lead the Way and the Science Museum of Minnesota.

NSF-funded Engineering Research Centers conduct pioneering research in emerging technologies and train the next generation of engineers to be leaders in innovation. Each center, while based at one university, is a collaborative partnership drawing together individuals and resources from other universities, industry partners, and pre-college teachers and students.

Familiar Faces Leave, New Faces Arrive

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Greg Shaver Joins the Faculty

Greg Shaver joined the Herrick Laboratories at the beginning of the academic year as an Assistant Professor. He is a Purdue University Mechanical Engineering alumnus, receiving his B.S. with highest distinction in 2000. He went to Stanford for his advanced degrees and received his M.S. in 2004 and his Ph.D. in 2005. His research interests include modeling, design and control of advanced powertrains; and powertrain control strategies that allow the efficient and clean use of conventional fuels, coal-derived fuels and biofuels. He is a member of the American Society of Mechanical Engineers and the Society of Automotive Engineers.



Look for articles about Greg's research in future issues of the newsletter.

Donna Cackley Moves to Herrick

Donna Cackley worked in the Mechanical Engineering building for 14 years. During her time there, she worked with many of our Herrick faculty members. When Linda Tutin announced her retirement, Donna applied for the position. After accepting the job, she moved to the Herrick Laboratories on November 13 to work with Linda during Linda's last week. Donna is rapidly learning the job. The next time you call or drop by the labs, stop by and say hello to Donna. We welcome her to the labs and look forward to working with her.



Looking Ahead

The Global Engineering Program at Purdue University will present the 10th Annual Colloquium on International Engineering Education Curricular Innovations for Global Engineering Competency on November 1-4, 2007 in Stewart Center at Purdue University.

The 2008 Purdue Compressor Engineering and Refrigeration and Air Conditioning Conferences and Short Courses will be on July 12-17, 2008.

As details on both events are available, the information will be posted on the Web.

A Note from Dick Erth

Hello to our fellow Herrick Labers—

I retired from Mine Safety Appliances in Pittsburgh this past February. This followed Norma's retirement two years ago from North Allegheny School District.

Looking back on my career, I am very grateful to Purdue and Herrick for giving me the education that enabled me to dabble in many business areas, including advanced development, engineering, marketing, and for the last four years organizational excellence. I've thoroughly enjoyed all the wonderful people with whom I've worked and the business challenges that I've faced.

Now that we're both retired, we wonder when we had time to work.

We began retirement by relocating to Arlington, Virginia to be near our two year old granddaughter, Sadie Ilene Symonds, our daughter, Stacey and son-in-law, Keith.

We traveled extensively during our first eight months of retirement. We finally had the time to take a five-year anniversary gift from our children and spent three weeks in Australia and New Zealand. What a beautiful part of the world! Our son Joseph married Diane Brown this past Memorial Day weekend in San Diego. He's a lead engineer with Solar Turbines, a division of Caterpillar, and credits his Purdue education and Herrick Lab experience with providing the skills he employs. We also regularly visit Norma's 91 year old Mom in Delray Beach, Florida.

Richard served this year as an examiner for the Baldrige National Quality Award and participated in a site visit in October.

Our current occupation is professional grandparents and adventurers. We greatly enjoy the DC area and the proximity to our daughter and her family. Our granddaughter is a joy!

Best regards to all of our Purdue family. Please say hello if you're ever in DC.

Richard and Norma Erth



Dick and Norma Erth with their granddaughter, Sadie.

This fall Mike and Donna Moaveni hosted a party for Herrick Alums in the Detroit area. Mike graduated from Herrick in 1972, after doing a Ph.D. with Jim Hamilton and Ray Cohen on prediction of dynamic strain in leaf-type compressor valves with variable mass and stiffness. He has been part of the Industrial Advisory Committee since 1999 and like Ed Eisle (see next article) and many of our other graduates, Mike has always emphasized how much the culture he was part of at the Laboratories has influenced him in his career, and defines for him the makings of an ideal work environment. Mike interviewed faculty, staff, students and alums and came up with a document describing the culture of the Laboratories. This was quite a project. He then distilled this into FASTID-C which



stands for Family, Acceptance, Sharing, Trust, Interdependent, Diversity—Community, a simple one-page document that new students receive when coming to the Laboratories, and we discuss during orientation. Mike expands on the individual words to explain the meaning more clearly.

Family—We have a sense of family. We feel, support and relate to each other as members of a functional family.

Acceptance—We receive and recognize you as you are and as you come. Through our acceptance, we feel calm, focused and energized to excel.

Sharing—Optimal use of assets happens through sharing. We share our resources.

Trust—Listening + Understanding + Support → Trust. Through this we gain the trust of people.

Interdependent—We at the Herrick Labs are mutually

dependent upon each other. This interdependency provides us with strength and resources to succeed.

Diversity—When we all stand in the same room, but look out through different windows, we may see different views. At Herrick Labs we are aware of this and respect it. We synergize our differences to enhance our solutions and strive for excellence.

Community—We are the Herrick Labs Community. We are a group of people, who value our cultural behaviors and its attributes.



Ginny Freeman and Linda Tutin went through our old photographs recently. The three on this page are the old barn when it had a tiled roof, Mike Moaveni as a young graduate student, and Mike in the background looking at Art Smith opening a present at one of the Lab gatherings. As some of you will recall, Art used to run the Shop and helped build many of the facilities that are still in use today. We were replacing an old air conditioner last year, and uncovered some of Art's duct work, which was so beautifully crafted, it seemed a pity to remove it. Dick Erth (Ph.D. 1970, IAC member 1980-present) is to the right.

The Unique Culture of Herrick Laboratories

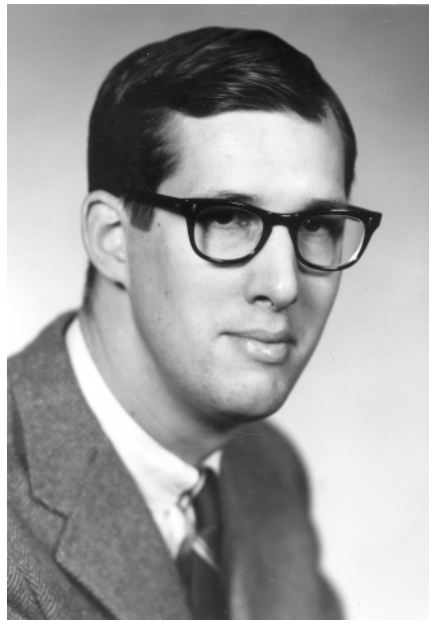
—Ed Eisele

During a recent visit to Purdue, Patricia Davies and I were discussing the proposed expansion and renovation of the Herrick Labs. We were in total agreement that one of the most important things to protect and nurture was the culture of the labs. This got me thinking about what an organization's culture is and, in particular, what was so unique about the culture of the Herrick Labs? Webster's Collegiate Dictionary's definition of culture is: "the integrated pattern of human knowledge, belief and behavior that depends upon one's capacity for learning and transmitting knowledge to future generations." This definition is rather pedantic but it seems mighty relevant with regard to understanding the Herrick Lab's culture.

In my opinion the Herrick Labs demanded excellence in everything we did. We observed it in the work of our fellow graduate students as well as the expectations of the staff. We simply did not want to do less than first class work. It was demonstrated in the care with which a compressor simulation was crafted which closely replicated experimental observations. It was evident in the painstaking effort required to put strain gauges on compressor valves or apply strain sensitive coatings. It showed in the pride of a graduate student when experimental data points supported theoretical work. If we had a piece of experimental equipment on the floor of the labs it had to be well done or we would hear about it not only from the staff but our fellow graduate students as well. In my view the work ethic at the Herrick Labs was: "if you can't do it right, don't do it at all!"

The Herrick Labs developed students who were good sales people and good communicators which are not skills commonly associated with engineers. Given that many companies visited the labs there were many opportunities to present what we were working on to people from industry who often asked very pointed and down-to-earth ques-

tions such as: "why are you doing this study and what are the practical applications?" Defending a thesis became a point of pride at the Herrick Labs. I don't know when it first got started but pulling together a professional presentation of our thesis work usually involved drawings, photographs and carefully prepared 35 mm slides. It also became common practice to have a trial thesis defense run by fellow graduate students who often were tougher on us than our thesis committee!



Edward "Ed" Eisele received his MSME in June 1965 and his Ph.D. in August 1969. He was named a Distinguished Engineering Alumnus in 1985 and an Outstanding Mechanical Engineer in 1991. He served on the Herrick Laboratories' Industrial Advisory Committee from 1984 to 1989. In 1990, he became a member of the Mechanical Engineering Industrial Advisory Council and serves in that capacity today.

It would be impossible to think about the Herrick Labs and its culture without remembering the coffee room. How many organizations would dedicate that much space for students to hang out? It certainly was the gathering point at one time of the day or another for everyone whether they were students, staff or the occasional spouse stopping by. Everyone was equal when they settled in there for a cup of coffee and conversation. It was a great place to get to know people on an informal basis. Although discussions might have centered on anything from Purdue sports to world politics, eventually the discussion turned to projects and someone's thesis work. Numerous good and constructive discussions occurred in that room and the blackboard usually got a good workout several times a day. Sometimes the discussion results were so pithy that a photo was taken of the blackboard to save the thoughts for posterity. During these discussions we all learned two valuable skills—how to tactfully critique a person's work and how to have our own work critiqued without becoming

defensive. The coffee room was also a "classroom" for knowledge to be passed on from the experienced graduate students to new students about such things as how to develop black and white film (pre-digital camera days), how to best make thermocouples and how to pitch pennies for free coffee.

In my opinion the culture of the Herrick Labs not only encouraged hard work but also the ability to kick back and have fun as well. Gatherings were particularly meaningful

Continued on next page

when they involved the staff, spouses and families so that everyone got to know each other better. The students were usually the instigators and did the planning but the staff pitched right in and had as much fun as the students. To me, the Herrick Labs was unique in the camaraderie between everyone who worked there regardless of their status. By the way, does anyone still have the recipe for Herrick Lab Christmas Punch or has it been banned as a hazardous substance?

The model shop was a place where education occurred as well. For example, we quickly developed valuable life skills when we were trying to move our project up the shop's priority list. We also quickly learned that being too pushy might result in our project moving way down the priority list. The staff in the model shop was tough on us if we didn't know what we really wanted and came in with half-baked ideas. If this were the case we were told to come back with a meaningful drawing after we had thought things through. If we needed a tool or instrument we had to know its proper name and take good care of it. There was also the satisfaction and learning in building something with our own hands with a little coaching from the shop staff. It was a rare Herrick Lab graduate that didn't end up with dirty hands at one time or another as well as an apprecia-

tion of what it took to build something.

Of particular significance to me was the cross functional nature of the Herrick Labs. We didn't do just one kind of work there but rather everything from stress analysis to noise work to fluid mechanics to heat transfer. What a wonderful place to learn about the many different areas of Mechanical Engineering and their applications! Best of all was that the knowledge transfer happened in a natural way as a result of interacting with fellow students working on their projects in the open laboratory structure.

Back in the mid to late 60's we didn't hear a lot about diversity but the Herrick Labs were very diverse with students from all over the U.S. and the world. Given the culture of the Herrick Labs everyone got along well together, learned to appreciate each other and became friends. Years later some of us still exchange cards and notes with Herrick Lab colleagues from all over the world.

As each of us spent time at the Herrick Labs we were changed and modified. We emerged not only with new found "book learning" but also valuable interpersonal skills and managerial skills that were relevant for a lifetime. It is critical that as the Herrick Labs expands and changes to adjust to the future that it does not lose this unique culture that has shaped and molded so many future engineering leaders.



Here is Ed Eisle (right) at the Herrick Labs Alumni Party in Detroit this Fall. On the left is Tim Roggenkamp (Ph.D. 1992) and in the center is the newest Herrick faculty member, Greg Shaver.



I/We would like to make a gift in support of Herrick Laboratories.

Please print:

Name(s): _____

Address: _____ Telephone: _____

City: _____ State: _____ Zip: _____ E-mail: _____

Please designate gift/pledge as indicated below:

\$ _____ Herrick Labs – Building Fund (009742)

Gifts to this fund will support construction of new facilities for Herrick Labs, including a perception-based engineering lab and a new administrative wing that will double as a living lab for researchers to evaluate such high-performance building qualities.

\$ _____ Ray Cohen Fund in Thermal Systems (008549)

Income from this endowed fund is used to provide lab instruments and facility modifications, support for graduate students, and seed interdisciplinary research efforts in the field of thermal systems.

\$ _____ Herrick Labs – General Fund (RF1193)

Gifts to this fund provide unrestricted support for the most critical needs of Herrick Labs.

\$ _____ William Fontaine Fellowship (007826)

Income from this endowed fund supports graduate fellowships in the School of Mechanical Engineering.

Gift Information

Total gift amount: \$ _____

Check enclosed (payable to **Purdue University**)

Bill my credit card. I authorize \$ _____ to be charged to my:

Visa MasterCard Discover American Express

Card Number: _____ Exp Date: _____

Print name as it appears on card: _____

Signature: _____ Date: _____

Pledge Information

I/We intend to make a total gift (excluding any anticipated matching gifts) of \$ _____

It is my/our desire to pay this pledge over a period of _____ years.

Please remind me/us: annually semi-annually quarterly monthly

Please send the first notice: _____ (month/year)

Signature: _____ Date: _____

Enclosed is my first payment (optional) of \$ _____

This gift/pledge will be matched. Company: _____

(Please obtain matching gift form, and submit completed form to the Purdue Foundation)

Please contact me to discuss gift options and naming opportunities.

If you have any questions, please contact John Sanderson or Alicia Pilon at (765) 494-7320.

Mail to: Purdue Foundation · Dick and Sandy Dauch Alumni Center · 403 W. Wood Street · West Lafayette, IN 47907-2007

Herrick Memories

Fun... Food... Music... Laughter...

Linda Tutin and Ginny Freeman were looking through and organizing some of our Herrick photos and found these photos along with many more. Do you remember any of these events or people?



Faculty and Staff Awards

Bob Bernhard was named a Faculty Fellow for the 2006-07 Committee on Institutional Cooperation Academic Leadership Program.

On June 24, **Yan Chen** was honored at the ASHRAE 2006 Annual Meeting with the Exceptional Service Award. The award recognized ASHRAE members who have served the Society faithfully and with exemplary effort.

Ray Cohen has been on the Chancellor's Advisory Board for two years and was just elected to be chairman of the Academic Committee of that Board.

Eckhard Groll was elected a Fellow of the American Society of Mechanical Engineers (ASME). The presentation will be on January 27, 2007.

George Chiu received the Team Award for the HP Digital Printing Systems Team at the School of Mechanical Engineering Awards Convocation held on September 24.

Gregory Shaver received the 2005 Best Paper Award for his article, "Dynamic Modeling of HCCI Engines Utilizing Variable Valve Actuation," published in the Journal of Dynamic Systems, Measurement, and Control. Greg received the award during the November ASME International Mechanical Engineering Congress and Exposition in Chicago.

A Committee for Mechanical Engineering Honors Program has been established, and **Doug Adams, Eckhard Groll,** and **Kai Ming Li** are serving on it.

Just for Fun

"Team OMEGA 2" won the Intramural Summer Sand Volleyball tournament and remained unbeaten throughout the tournament. Our own **Scott James** was part of the winning team. OMEGA is an acronym for the "Official Mechanical Engineering Graduate Association."

Thank you

A special note of thanks goes to Virginia Freeman, Administrative Assistant for Conferences. She wrapped gifts and made the food arrangements for Linda Tutin's retirement reception. She also stayed up late the night before making finger sandwiches at home.

Oops! We Goofed!

In our last newsletter, we erroneously reported that Raymond Joshua had graduated. We had the wrong name. It was Joshua McKinsey. Our apologies to Josh.

Herrick Laboratories Family News

Engagements

Alok Joshi (current graduate student) and Dipti Bapat were engaged in Pune, India on June 10, and Alok left the next day to return to Purdue. The couple is planning a December wedding in Pune.

Jeffrey Peters (current graduate student) and Kerry Fronczak from Valparaiso, Indiana were engaged in September.

Weddings

Lorenzo Cremaschi (former visiting scholar) and new wife, Selen, were married on June 23. Lorenzo is now a faculty member at Oklahoma State University in Stillwater.

Births

Detlev Seidel (M.S., 1998) and his wife, Nicole, became parents of another son. Moritz Lukas was born on July 24. He was welcomed by his sister, Leoni, and his brother, Felix. Detlev is now Deputy Managing Director at his company in Germany.

Richard Yun (MSME, 1998) and his wife, Erica, welcomed a new baby boy, Daniel, on June 1.

Graduations

Patrick Cunningham (Ph.D., December 2006), *Monitoring Diesel Particulate Filters*. Patrick joined the faculty in the Mechanical Engineering Department at Rose-Hulman Institute of Technology as an Assistant Professor. He will be teaching a variety of classes including courses covering computer applications in engineering, measurement systems, dynamic systems and control, and IC engines. Patrick also plans to continue research on monitoring and control of transportation systems and to branch out into the field of engineering education.

Paul Deignan (Ph.D., December 2006), *Information-Theoretic System Identification*. Paul is Principal Engineer for L-3 Communications Integrated Systems in Greenville, Texas.

Timothy Johnson (Ph.D., December 2006), *Diagnostics of Bead Area Damage in Rolling Tire Durability Tests*. Tim is still considering which of many offers to take.

Kyoung Ho Lee (Ph.D., December 2006), *Demand-limiting Control Using Building Thermal Mass in Commercial Buildings*. Kyoung Ho is on a leave of absence from his employer in Korea to earn his Ph.D. degree and will return now that his degree has been awarded.

Where Are They Now?



Herrick alums gathered in Washington State. Pictured left to right are first row: Grant Ingram, Alaina Pizzo, Vince Badagnani, Tamaira Montgomery, Rich Widdle. Second row: Seth White, Paola Massoli, Mert Geveci, and Steve Montgomery.

James J. “Jim” Allen (Ph.D., 1981) received the Mechanical Engineering Outstanding Alumnus Award at Purdue on October 26. Jim started working at Sandia in 1985 and is currently a Distinguished Member of the Technical Staff in the MEMS Device Technologies Department at Sandia National Laboratories in Albuquerque, New Mexico. Jim received several honors while working at Sandia. Jim’s BSME and MSME are from the University of Arkansas, and in 2001 he received the Arkansas Academy of Mechanical Engineering Award. In 2003 he received the NNSA Defense Program Award of Excellence Award,



Satyam Bendapudi (Ph.D., 2004) and his family, Kanti, Kashyap and Rishabh enjoying the Labor Day weekend at Quassy Park, a childrens amusement park, in Middlebury, Connecticut about 40 miles from where he lives.

and in 2004 he was selected as an ASME Fellow. Jim’s faculty advisor at the Herrick Laboratories was Jim Hamilton.

Thierry Beauvilain (MSME, 1993) works for Hutchinson at the corporate research center next to Montargis (110 km south of Paris) where he is the Noise and Vibration Group Manager for 15 people. The group does advanced research and also technical support to Hutchinson’s R&D departments throughout the world. He joined Hutchinson a year ago and moved with his family from Paris to that region: Loiret. He married 4 years ago and has a son, Paul who will be 2 years old in May. After 12 years in Paris he and his family decided to move to the countryside where life is much more enjoyable without the stress of a big city and without the traffic pollution. A much better environment to raise kids!

Ziqiang Hu (Ph.D., 1992) left General Electric in the U.S. to join Samsung as a Vice President, and he is the Director of Research and Development at Samsung’s Suzhou plant in China (about one hour from Shanghai, Dr. Hu’s home). All of his family except his daughter, Katie, are now living in Shanghai. Dr. Hu was recruited to Samsung by his former Herrick Lab office-mate Sung Jin Kim (Ph.D., 1992) who is also a Samsung Vice President working with the appliance group in Suwon, Korea.

Daqing Li (MSME, 2001; Ph.D., 2006) is working for Carrier in Syracuse, New York. He attended the Compressor Conference this past summer and stopped in to say “Hello!”



Stuart Bolton had the opportunity to visit a former student, Denny Yim (MSME, 1995), who now lives in Milpitas, California, and works for Oracle. Pictured left to right are Stuart Bolton; Denny Yim; his wife, Jackie; and their son, Ethan.

Contract and Grant Awards

(5/1/2006-11/30/2006)

Air-Conditioning and Refrigeration Technology Institute, Inc., “Recovery of Throttling Losses by a Two-phase Ejector in a Vapor Compression Cycle,” *E. Groll*

Air Force Research Laboratory, “Development of a System Design Methodology for Robust Thermal Control Systems to Support Operationally Responsive Space,” *J. Braun*

American Concrete Pavement Association, “Investigation of Methods to Produce Quieter PCC Pavements by Grinding and Imprinting Surface Texture,” *R. Bernhard*

ASHRAE, “ASHRAE Fellowship,” *J. Braun*

Army Research Office, “Evaluation of Impact Mitigation and Health Monitoring Tradeoffs in Composite Missile Casing Design Using Iterative Inversion Loads and Damage Identification Methods,” *D. Adams*

Army Research Office, “Integrated Diagnostics and Reliability Forecasting for Hybrid Structures Through Similarity Modeling of Nonlinearity, Time-Variance, and Uncertainty,” *D. Adams*

Comet Technology Corporation, “Verification and Validation of Comet EFEM,” *R. Bernhard*

Cummins Engine Co., “Determining the State of a Diesel Particulate Filter,” *P. Meckl*

Cummins Engine Co., “Sensing Strategies for the Charge Handling System,” *P. Meckl*

Ecotope, Inc., “Off-Design Performance for Residential Heat Pumps,” *J. Braun*

FAA, “Center for Excellence for Aircraft Noise and Aviation Emissions Mitigation,” *R. Bernhard*

FAA, “Center of Excellence for Aircraft Noise and Aviation Emissions Mitigation,” *K. M. Li*

Fibertek Inc./US Army Communications-EC, “Multi-objective optimization of small tactical electric power units for reduced noise and increased power density,” *P. Meckl*

Hewlett Packard, “Commutation Torque Ripple Compensation Using Angular Displacement Based Repetitive Control,” *G. Chiu*

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*

National Institute of Standards and Technology, “Moisture Transport Modeling for Residences,” *J. Braun*

National Science Foundation, “CT-ISG: printed and sensor forensics,” *G. Chiu*

National Science Foundation, “Integrated Direct and Indirect Adaptive Robust Control with Quantitative Robust Parameter Estimation-Theory and Applications to Intelligent and Precision Control of Modern Mechanical Systems,” *B. Yao*

NAVSEA/NSWC Crane, “Real-Time Predictive Modeling and Simulation for Prognosis in Smartship/ System of Systems that Anticipate and Manage,” *D. Adams*

P. C. Krause and Associates, Inc./AFRL, “Security of Large-scale Systems,” *D. Adams*

Purdue Research Foundation, “Modeling/Control of a Robotic Endoscope via Undulated Motion,” *K. Peterson*

Purdue Research Foundation, “Characterization, Evaluation, and Prediction of Impacts of Airport Noise on Neighborhood Communities,” *K. M. Li*

Samsung Electronics Co, Ltd., “Next Generation Image Capture to Improve Copy Quality—A Two Phase Approach,” *G. Chiu*

Tecumseh Products, Inc., “Alternative Cooling Techniques,” *E. Groll*

Universal Technology Corporation/AFRL, “Systems Approach to Design of Experiments for Health Monitoring of Material Components,” *D. Adams*

University of Cincinnati/NIH, “Phonatory Aerodynamics,” *L. Mongeau*

PURDUE

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A group of our past grads or past employees met in Seattle, Washington late last summer. Pictured around the table are left side, Yong Joe Kim (Ph.D., 2003), Nancy Gold, Heng-Yi Lai (Ph.D., 1997), and Adam Weston (MSME, 1997). On right side, Rich Widdle (Ph.D., 2005), Alaina Pizzo (MSME, 2000; Ph.D. in ME 2005), Steve Montgomery (MSME, 1997; Ph.D. 2000), and Vince Badagnani (MSME, 2005).