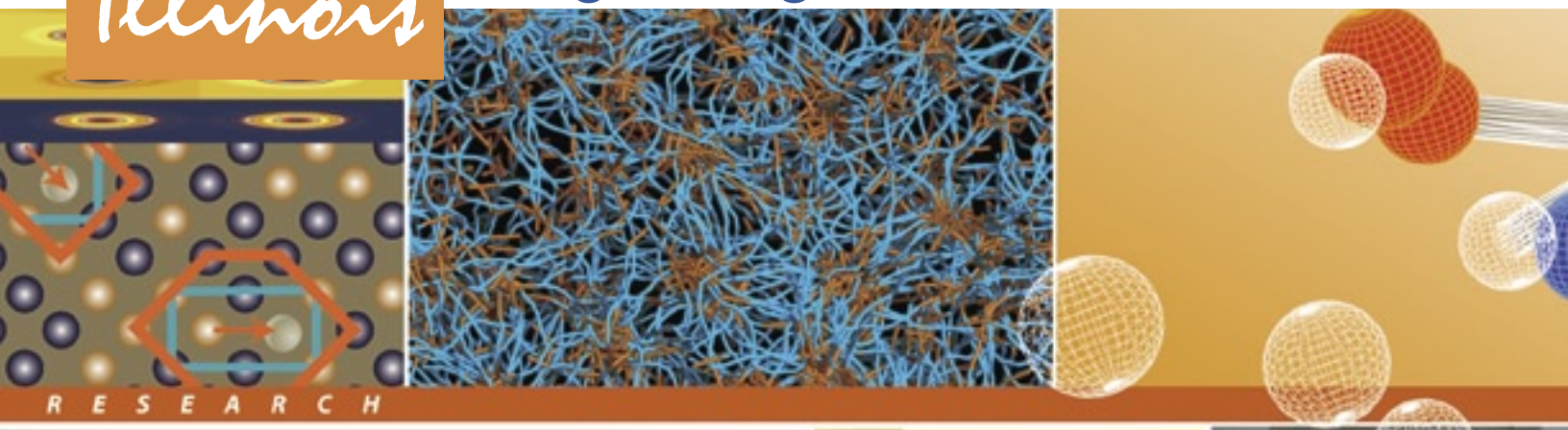
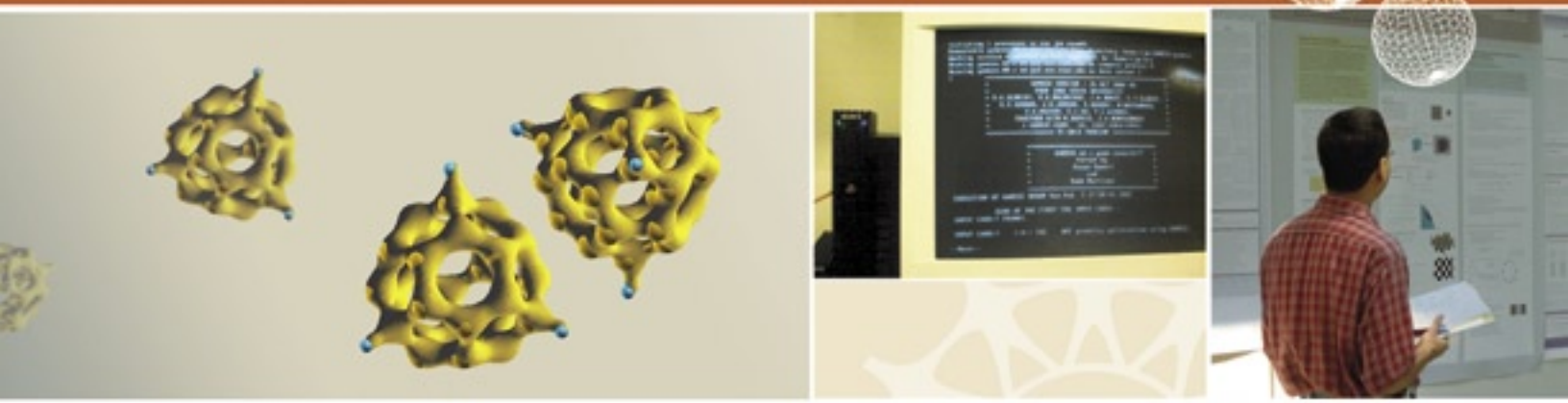
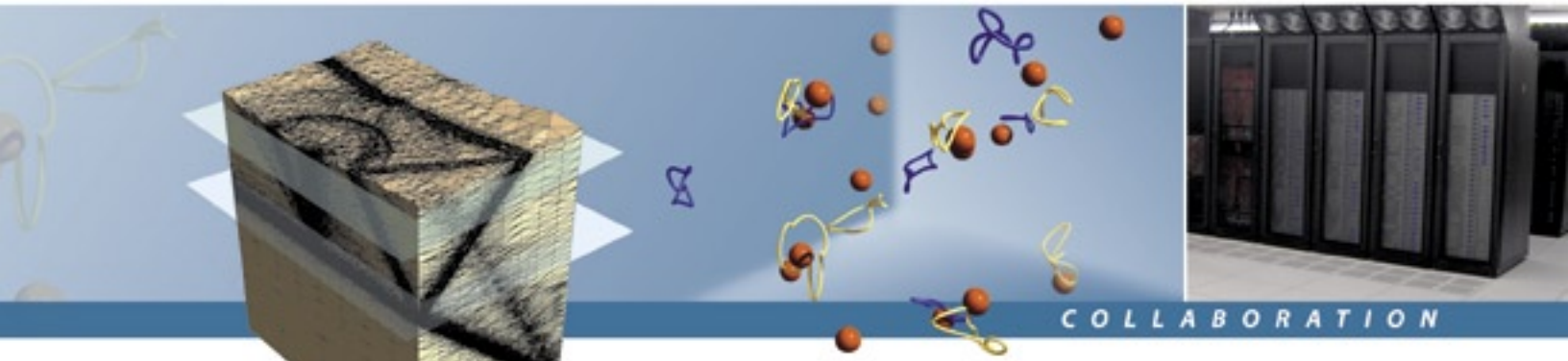
MatSE Illinois

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Department of Materials Science and Engineering







SUMMER 2005 ALUMNI NEWS

Materials Computation Center – Future materials by computational design

Howard Birnbaum – A legacy of humor and excellence

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On the Cover

The work performed at the Materials Computation Center is supported by the National Science Foundation under award number DMR-03 25939 ITR, with additional support through the Frederick Seitz Materials Research Laboratory (U.S. Dept. of Energy award no. DEFG02-91ER45439) at the University of Illinois Urbana-Champaign. For details about the research presented here, visit www.mcc.uiuc.edu/research/.

TOP ROW Left top: Spintronics in Quantum Dots (QD): Single particle wave functions in a symmetric coupled QD. (J.-P. Leburton and R. M. Martin) Left bottom: Kinetic Simulation: Surface of a binary alloy with two vacancies showing first and second nearest neighbor (n.n.) diffusion paths with first (blue box) and second (orange box) n.n. chemical arrangements. (D. D. Johnson, D. E. Goldberg, P. Bellon, and student K. Sastry) Middle: Polymeric and Polyelectrolytic Materials: Snapshot of a molecular dynamics simulation. (E. Luijten and student L. Guo) Right: Complexity of Small Silicon: Atomistic simulations reveal new defects structures that are key to understanding complex dynamics in silicon. (J. N. Kim)

SECOND ROW Left: Electron Phonon Interactions in C_{28}-derived Molecular Solids: Isocharge density surface of face-bonded $C_{28}H_4$ solid. (N. A. Romero, J. N. Kim, and R. M. Martin) Middle: Hijacking Game Consoles for Computational Chemistry: We are developing quantum chemical and linear algebra software to use new generations of game consoles as supercomputers that even high schools can afford (T. J. Martinez and S. Patel) Right: Ph.D. candidate Nichols Romero and Jeongnim Kim discuss simulation results.

THIRD ROW Left: First-year graduate student Matthew Delgado and visiting undergraduate Ma'ayan Bresler (Princeton) collaborate on a 2004 Summer Research Experience for Undergraduates project, advised by Karin Dahmen, Physics. Middle: The MCC Travel program, administered by David Ceperley, provides international travel opportunities for young researchers and a way to develop international contacts. Alan Aspuru-Guzik, 2004 Travel Program Awardee, calls his trip to the Quantum Monte Carlo Winter School in Trieste, Italy, "an invaluable experience for my graduate education." Right: Review of major computational research projects: For a second year, MCC and MRL hosted a national review on behalf of the NSF Division of Materials Research.

BOTTOM ROW Left: The Center for Process of Simulation Design (Director: Robert B. Haber) collaborates with MCC and other mechanicians, materials scientists, computer scientists and mathematicians to develop advanced techniques for simulating materials microstructures. Adaptive spacetime mesh reveals fine details of shockwave trajectories in crack-tip wave scattering example. (M. Garland) Middle: A snapshot of a path integral Monte Carlo simulation of fluid sodium at high temperature in a periodic cell. The orange spheres represent sodium ions, while the yellow and blue bands represent the imaginary time paths of valance electrons with up and down spins, respectively. (K. P. Esler) Right: MCC along with seven other University units and Apple Computer have sponsored the Apple Turing Cluster. The new cluster offers 1280 processors. (Photos: M. Heath)

From the Head

I am writing this letter to you just as we complete graduation for the class of 2005. Our graduation brunch was well attended with over 170 people—students, family, friends and faculty—joining us to celebrate the achievements of another school year. I was surprised and impressed with the diversity of career paths chosen. About 40% of the graduating class will pursue advanced science and engineering degrees; others are beginning their engineering careers; and an increasing number are opting for careers in law and business. Irrespective of their chosen career path, they are now part of your group, and I hope you will continue the tradition of welcoming and helping our new alumni. We rely on you to continue the excellence of our program.

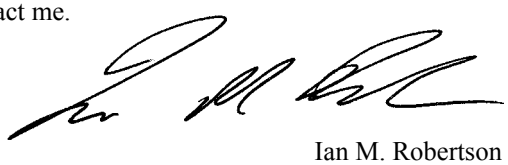
We are being faced with yet another tough budget projection for the 2005-2006 academic year. Despite the continuing decrease in State support, your department continues to thrive and to start new efforts. This is made possible in part due to your generosity and to changes we introduced previously. Your support will be needed even more in the future and I, along with some alumni, will be contacting you in the near future about specific needs and how you can help. Please remember there are many ways other than just financial in which you can support your department. I am confident that with your help we will be able to continue to invest in our future.

Our summer undergraduate research program will be held again this year. Our numbers continue to grow and we will have 20 students from around the country spending the summer in our research groups. We have an active program planned that includes not only developing research and presentation skills but also seminars on leadership and entrepreneurship. These seminars, which are possible because of alumni involvement, are being introduced to broaden the student experiences and to make them aware of other career opportunities. It looks like the summer will be very busy and I look forward to reporting to you on the program in my next letter.

With all of the successes enjoyed by our faculty and our students, this semester was marred for me by the sudden passing in January of a colleague and my closest friend, Professor Howard Birnbaum. The Birnbaum family received many emails and letters from alumni who remembered Howard and how he impacted their lives. Many of his graduate students recounted their experiences with Howard in the laboratory and the "instruction" they received when the tools were in the wrong place or they did something the wrong way – a memory his family shared with his students. Others recalled the kindness Howard and Freda had shown them and their family when they visited Illinois. Howard will be remembered for his scientific leadership and his willingness to state his opinion on scientific issues and science policy, even if occasionally his viewpoint was against that of his friends. He will be remembered as well for his humor, his sincerity and his friendship. The sudden loss of Howard has created a void in our department, in the college, and in the materials science community. To continue the memory of Howard, the department, in conjunction with the Frederick Seitz Materials Research Laboratory, is establishing the Howard Birnbaum Lecture Series to bring leaders and visionaries in our field to campus. The first in the series will be part of a special symposium honoring Howard's contributions to materials science and engineering. The symposium will be held on campus next year. If you are interested in participating in the symposium, please send me a note and I will keep you informed of our plans.To make this lecture an annual event, an endowment of at least $100,000 must be established. I ask you to join me in contributing to Howard's fund; you can use the form on page 6 or donate online at www.mse.uiuc.edu/alumni/giving.edu, indicating that the gift is for the "Howard Birnbaum Lecture Series." If you are interested in participating in the symposium, please send me a note and I will keep you informed of our plans.

We will be hosting an alumni event at the Materials Science & Technology 2005 conference in Pittsburgh and another at the Fall MRS meeting. I invite you to attend and to renew acquaintances and to meet the new faculty and students. Look for details about alumni events on our website.

If you have questions, concerns or want to just learn more about how your department is evolving please contact me.



Ian M. Robertson
Department Head

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Materials Computation Center

by Duane Johnson, Director, Professor of Materials Science and Engineering, and Bliss Faculty Scholar

Computational materials science (CMS) has become the third member of the "triumvirate" of materials science: experiment, theory and computation. Most often CMS is used to offer vital information to interpret observation, while we are seeing more instances where it is predicting useful directions or materials to explore for real applications. However, algorithmic developments, including computer science and applied mathematics, are often as critical as new theoretical methods to be able to tackle more and more complex problems presenting themselves in nano- and bio-sciences (or more traditionally surface, interface, and molecular interactions). Hence, to tackle far-reaching technological issues, we need to integrate new scientific and computer science related methods by crossing traditional boundaries, as well as educate students in applying multidisciplinary methods successful on such problems.

The National Science Foundation supported Materials Computation Center (MCC) provides an intellectual and interactive environment for researchers to support world-class, multidisciplinary education and research in computational materials science that spans traditional area boundaries. The MCC involves over 10 departments and programs (e.g., Materials Science, Physics, Chemistry, Electrical Engineering and Computer Science). The main MCC mission is science-driven rather than engineering-driven because of the programs that fund the MCC (NSF division of chemistry, division of materials research, and computer infrastructure in science and engineering) but the center is actively supported by the College of Engineering and the Fredrick Seitz Materials Research Laboratory. The MCC also receives support from corporations through interactions with researchers.

To promote networking and education of researchers and students locally and worldwide, the MCC sponsors summer schools on current topics (e.g., computational biophysics, interface and nanoscience) and facilitates the creation of useful tools and algorithms for research and education. In fact, the MCC has directly supported new computational faculty, such as Prof. Erik Luijten, in an effort to generate excellence and success in new areas. In addition, the MCC hosts a Web-based, shared-resource software archive that contains codes fostering research and education. All interested parties are invited to contribute to the Software Archive (see www.mcc.uiuc.edu).

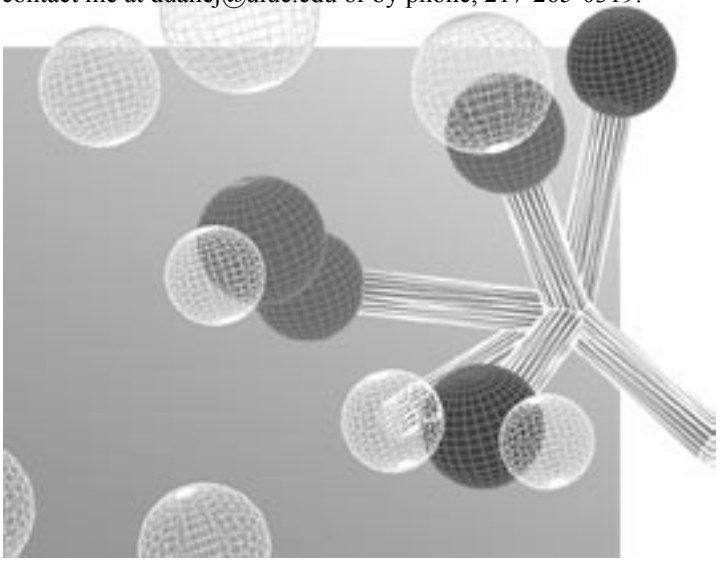
Research areas evolve but include computer science applications such as scalable, parallel modeling of multiscale problems; algorithms that scale as the number of atoms in the system – so-called order-N methods; complex systems (e.g., electronic response in quantum dots, and *machine-learning* methods for multiscale modeling in engineering and in quantum chemistry for reaction pathway studies); computational biophysics; and improved classical/quantum simulations such as polymer electrolytes. We also directly support broader interactions such as the Division of Computational Physics at the American Physics Society and the NSF Research Experience for Undergraduates (REU) here at Illinois.

These research areas have led to corporate interactions. For example Prof. Todd Martinez, Chemistry, has led an effort to use *gaming technology* (like PlayStation2®) and the speed of graphics processors to make a cheap "supercomputer" for quantum chemistry (faster than INTEL Pentium III processor used in original comparison). As a result the MCC has been working with IBM on their new "cell" architecture directly, using similar ideas for immediate applications of the cell technology.

To enable advanced simulation, the MCC has cooperated with five other units in the College of Engineering to purchase a 1280 processor Apple G5 shared-memory system, with support from IBM (total cost $4.5M with $1.5M section donated). Currently this machine comes in at about 10 Teraflops, or one of the fastest machines at a U.S. university.

The scientific applications that have been enabled by the new theoretical and algorithmic methods and new computational resources are too numerous to mention, but small one-slide "nuggets" of accomplishments can be found on the MCC website, www.mcc.uiuc.edu. Also, there are engineering-related problems that have arisen from these interactions, especially within Materials Science and Engineering: predicting new surface defects during halogen etching of silicon (Duane Johnson, John Weaver); predicting metallic alloys that will exhibit important yield-strength anomalies with temperature; and guiding experiments on clean-water initiatives using advanced polymeric simulations (Erik Luijten), to name but a few.

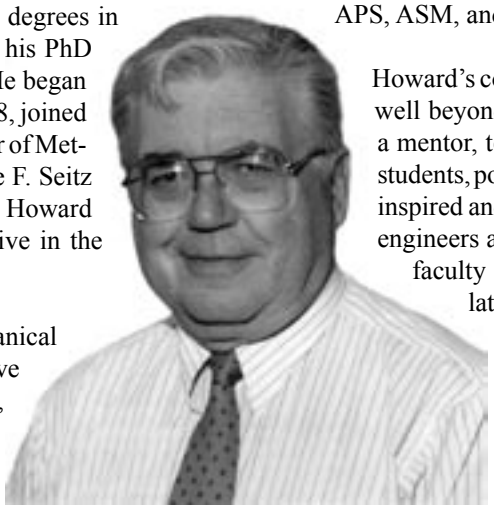
For more information on how MCC may interact with your company on CMS-related projects, or other issues, please feel free to contact me at duanej@uiuc.edu or by phone, 217-265-0319.



Howard Birnbaum, 1932-2005

Howard Birnabum, 72, Professor Emeritus, passed away on January 23, 2005. He is survived by his wife, Freda; his three children Elisa, Scott and Shari; his grandchildren Aaron, Samuel, Zachary and Hannah; and his sister Sybil Licht.

Howard was born October 18, 1932, in Brooklyn, New York. He received his BS (1953) and MS (1955) degrees in metallurgy from Columbia University, and his PhD degree (1958) in metallurgy from UIUC. He began teaching at the University of Chicago in 1958, joined the faculty at UIUC as an Associate Professor of Metallurgy in 1961, and became Director of the F. Seitz Materials Research Laboratory in 1989. Howard officially retired in 1999 but remained active in the scientific community.



Howard's research focused on how mechanical deformation and plastic flow in materials derive from the complex interaction of point, line, and planar defects. His early work showed how point defects caused yield effects, provided insight to dislocation core structures, determined interaction energies of point defects and obstacles, and demonstrated that hydrogen diffusion at low temperature occurs by quantum tunneling. His later work focused on hydrogen effects in metals, including hydrogen diffusion, hydrogen trapping, hydrogen ordering, and hydrogen embrittlement mechanisms. Howard's honors included a Guggenheim Fellowship, the Mehl Gold Medal award from AIME, the von Hippel Award from the MRS, and the DOE award for outstanding research and for sustained scientific contributions. He was a NAE member and a fellow of the American Academy of Arts and Sciences, AAAS, APS, ASM, and TMS.

Howard's contribution to science and engineering extends well beyond the scientific papers he published. He was a mentor, teacher and role model for his many graduate students, post-doctoral fellows, and faculty colleagues. He inspired and challenged them to become better scientists, engineers and citizens. Howard was part of the group of faculty who built the reputation of Metallurgy and later Materials Science and Engineering at UIUC. He influenced the direction of science on a national scale through his involvement on committees, panels and advisory boards. Howard enjoyed debating science and scientific policy and although these debates could become rather heated, they were always conducted with a sense of humor and friendship. Howard will be missed not only for his scientific contributions and leadership, but for his humor and wit.

Lillig and Odeh elected to MatSE Alumni Board

Daniel Lillig (BS Met '93, PhD MatSE '00) received his Ph.D. under the guidance of Prof. Ian Robertson. His doctorate work was an investigation of the effects of hydrogen on the structure and properties of intermetallics (nickel and iron aluminides), especially the lack of ductility in polycrystalline Ni_3Al. After graduation, he joined the ExxonMobil Upstream Research Company as a research engineer. Lillig's initial research involved the development of high-strength low-temperature ferritic steel and associated welding and fabrication procedures. After implementing that work in a 29-ton prototype, he moved on to research projects in estimating reliability of systems built with new materials and fabrication techniques, developing innovative solutions to the long-distance transportation of natural gas, and designing experiments to determine the effectiveness of well stimulation techniques which allow individual wells to be more productive. Lillig has recently moved to the ExxonMobil Development Company where he provides welding and fabrication support directly to ExxonMobil's worldwide oil and gas resource development projects. He married Dorothy Puch Lillig (UIUC A.B. Sociology '95, M.Ed. '99) in June 1995. They live in Sugar Land, Texas, with their two children: Jack, 6, and Anna, 2.

Atif Odeh (BS Met '92) is president and principal metallurgist for ATRONA Material Testing Laboratories, a metallurgical, materials, and mechanical testing services laboratory and consulting firm he founded in 1999. ATRONA has grown in the last five years to an 11,000 sq ft state of the art engineering laboratory and currently employs 10 staff members. Odeh's experience includes two years of research, development, and material testing for the Army Corps of Engineers and nine years of plant metallurgy for manufacturing and private sectors including aerospace, heavy machinery, off-highway industry, gearing industry and heat treat. He has held the positions of plant metallurgist, environmental manager, product engineering manager, plant superintendent, and project manager. Odeh has consulted and assisted companies in China, Korea, India, Europe, South America, Japan, and Canada. He is the author of "Metallurgy and Heat Treatment, the Pocket Book," that summarizes the essentials of metallurgy and materials and their heat treatment along with personal experiences for what works. For 18 years, he has been married to his wife Robin (UIUC M.S. Rehab Counseling '92), who is an integral part of ATRONA. The couple have three children: Nadia 13, Adam, 10, and Nathan 6.

Obituaries

Cloyd M. Smith (BS Met '20) died February 10, 2005, in Lafayette, Ind. He served in the Navy during World War II. He enjoyed flying and maintaining his private pilot's license. He married Mary Carnes on January 14, 1951. He worked 40 years as a construction manager and general contractor on projects throughout Illinois and Indiana. He was a member of Central Presbyterian Church and a volunteer for Meals on Wheels. Survivors include his wife; a daughter, Karen; and three sons, Clark, Terry, and Douglas.

Bernard "Pat" Coen (BS Cer '34) died March 4, 2005, in Chicago. He was retired from Eljer Plumbing Ware in Tupelo, Miss., where he had worked as plant manager. He is survived by his wife Annabelle and two children.

Raymond C. Bertram (BS Cer '41), 85, a World War II veteran and retired chemical engineer, died February 22, 2005. He served in Africa and Italy for two years as a general service engineer for the Army. In 1948, he married his wife of 56 years, Jeanette. The couple settled in Bristol, Ill., where he was an active member of the Kendall County Historical Society and the Oak Grove Cemetery Board. For several years, he worked for Lyon Metal in Montgomery as head of the paint department. He later was employed by Glidden Paint Co. in Chicago where he worked for more than 25 years as a technical service representative. In addition to his wife, he is survived by three sons, Jim, Guy and David; a daughter, Susan; and eight grandchildren.

Louis W. Landeck (BS Met '41) died February 9, 2005. He married Opal Fiscus on May 30, 1941; she survives. He was a metallurgical engineer for Westinghouse Electric Corp. for 41 years. He was a member of Faith Memorial Lutheran Church, Valparaiso, Ind., and the U.S. Power Squadron and the Lima (Ohio) Management Club. Survivors also include four children, Linda, Lu, Sherry, and Bill; nine grandchildren; and two great-grandchildren.

Roy Thornton Jr. (BS Cer '41) died January 1, 2005, in Danville, Ill. He married Clara Neupert on September 6, 1941; she survives. He served as a captain in the 556th Anti-Aircraft Battalion in the European Theater during World War II. Following the war, he worked in sales and management for Celotex Corporation for 34 years, retiring in 1984. Survivors also include two daughters, Susan and Anne; four grandchildren; and five great-grandchildren.

Lowell Thomas Lloyd (BS Met '44), 83, died March 25, 2005, at his home in Lisle, Ill. He retired from his position as assistant director of the Materials Science Division at Argonne National Laboratory after 40 years of service. He was a veteran of the U.S. Navy. He was a member of the University of Illinois Alumni Association and the American Society of Metals. He enjoyed fishing, gardening, computers and playing bridge. He is survived by his children, Elisabeth, John, James and William; nine grandchildren; and two great-grandchildren. He was preceded in death by his wife of 53 years, Marybeth (Sisney) Lloyd.

continued on page 11

Department of Materials Science & Engineering Fund

Yes, I want to support MatSE with my gift of: ❒ $1,000 ❒ $500 ❒ $250 ❒ $100 ❒ Other:_____

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Success in Business through Engineering

by Joe Harmon (BS MatSE '00)

There are some who believe that engineering and business do not mix. In the five years since graduation, I have learned that this could not be further from the truth. Because of their strong analytical skills and objective thinking, engineers are coveted in the business world in roles other than engineering.

My Materials Science and Engineering degree has served me well since I graduated from the University of Illinois. After graduation, I moved to Austin, TX, and started working in manufacturing at Advanced Micro Devices (AMD). In four and a half years, I moved from a rotational engineering program to a production support role on night shift and eventually to a process engineer / project management role. Understanding the basic principles behind semiconductor products and processing equipment allowed me to focus on solving the right problems quickly. Once I was managing multiple projects, I realized that all of the skills and basic knowledge I possessed would be applicable to the business world as well. For me, a Masters in Business Administration (MBA) seemed like the best solution.

"Engineers are coveted in the business world in roles other than engineering."

At first, I was worried that my MatSE and manufacturing background would make me the odd man out. I thought that the typical applicants for business school were consultants and investment bankers. I was wrong. An engineering and manufacturing background put me in line with many other applicants. Forty-four percent of the class of 2005 studied engineering as an undergraduate. In fact, my specific background gave me the credentials needed to enroll in the Master of Manufacturing and Management program at Northwestern University. This program grants both an MBA and a Masters in Engineering Management (MEM) degree in two years and attracts candidates with backgrounds similar to mine.

At business school, my engineering background continued to serve me well. Case studies are one of the main teaching tools used at business school. A case study presents a problem that a specific company faced, some of the data that the company had at the time, and in some cases the outcome of their decisions. I have found that engineers are able to quickly comb through the case, understand the company background, find the problem, parse through the presented data and present a solution that is supported with relevant data.

Another benefit of having an engineering background in business school is that a rigorous engineering undergraduate program allows you to quickly master business school concepts. Engineers can focus on further development of other critical skills such as leadership and team building. In several study groups, I have been able to quickly understand and present the data (using the blessing that is Excel) to the rest of my group and move on to conclusions. All hail the engineer!

As I complete my graduate education, I feel confident that my background of engineering and business will make me a strong candidate in the job search. Consulting firms, investment banks, consumer product companies, and manufacturing companies all value graduates with my background. We bring a combination of leadership, communication ability, and analytical skills that are prized in almost any industry.

Happy Birthday MatSE & U of I

Did you know that MatSE dates back to the founding of the University of Illinois when the University was required to have a mining program as part of its mission as a land-grant institution? The first classes were held on March 2, 1868. To celebrate 137 years of the U of I and MatSE's roots, the Department held a birthday party on March 2, 2005, complete with cake, punch and even balloons! In the photo above, graduate student Summer Rhodes enters the drawing for free MatSE merchandise while fellow graduate student Samantha Bender assists at the cake table.

Engineering Open House 2005

MatSE projects won 9 of the 31 awards at the 2005 Engineering Open House. This year UIUC took EOH to the Chicago area, allowing an even greater number of people to experience the "Best of Engineering Open House." The "Best of EOH" was held at the Museum of Science and Industry on April 1-2. Approximately 13 of the best UIUC EOH exhibits were showcased during the Chicago Public School's Annual Science Fair held at the museum. Of the five groups (representing 6 of MatSE's 9 awards) that applied for the "Best of EOH" competition, all five were selected to go to Chicago. MatSE exhibits represented ***40%*** of the Best of EOH, quite an accomplishment considering that MatSE only makes up 4% of the College of Engineering! Following is a snapshot of our EOH student experiences.

Part of the reason I chose to do my EOH project on "Goop and Slime" was because it was a subject in which little kids would be interested. I enjoyed working EOH most of all because I got to work with the kids and it was nice to be able to show them some fun aspects of engineering. -Susan Bickner

Our project was inspired by the popular TV show "Myth Busters" in which we created a movie investigating the science behind ice skating. Every year the MatSE students do the Materials Show and we wanted to carry on this long-standing tradition by creating a video that was fun and informative. We met on the weekends for five weeks before EOH. Our meetings included planning, writing out the script for the movie, and editing. It was a fantastic experience. We had so much fun making the video and we were happy that everyone really enjoyed it. -Kyle Wilcoxen

Kim Chan watches kindergarteners Tom Brya and Cam Hieser make edible atoms from marshmallows and pretzel sticks.

The title of the project was "Bent out of Shape and Stretched to the Limit." Our group's goal was to introduce the world of polymers to the general public and get them to appreciate that a huge number of the products and services they encounter on a daily basis are made from polymers. We talked about basic structures and processing techniques, and why/how polymers are suited for a wide variety of applications. Visitors were encouraged to touch the samples and guess what they might be. We also had a contest for visitors to see how far they could stretch a strip of polyethylene before breaking it, and the winners received silly putty (an elastomer) as a prize. -Meena Babu

In our project "Materials in Sports," we looked at various pieces of sports equipment and described the materials that went into them, why they're better than the old materials. Visitors asked about the baseball equipment, how corked bats are any different than regular ones and how the catchers' gear has been improved. -Amy Minas

The "Edible Atoms" project was geared towards a younger audience. We used candy to simplify and explain different materials. We also did a tensile test on both Peeps and Twizlers to see which had ductile fracture. Many visitors were interested in learning more and even wanted to know if we had a student group who would go to local schools and perform similar demonstrations! It's always fun to share something you know with others. -Teri Mosher

Our project, "A New Spin on Spider Web" was about artificial spider web created by genetically engineering goats to produce spider silk proteins in their milk using spider genes. In many ways, this could be considered man-made spider web, similar to Spider-Man's webbing! This artificial spider web was first and only created by the Canadian Bioengineering Company, Nexia, who calls their web product BioSteel. What is most interesting about BioSteel is that it has a unique combination of properties including high tensile strength, toughness, flexibility, biocompatibility and water insolubility. Because this great material is also organic, there is a huge potential for applications in the medical industry. -Aaron Chan

At right: Visitors make ceramic composites by mixing plaster with their choice of "matrix" material (dry spaghetti, straws, paper clips, gravel, etc.). After the plaster rod samples hardened, EOH project members tested the strength of the rods by applying a weight on the sample until it reached the breaking point. Visitors found out the results of the testing on a website one of the team members created for the project.

Department Notes

Duane Johnson is one of five recipients in the College of Engineering of a Bliss Faculty Scholar Award.

Jennifer Lewis has been elected a Fellow of the ACerS.

John Weaver has been elected a Fellow of the American Association for the Advancement of Science.

Angus Rockett and **Phil Geil** received undergraduate advising awards from the College of Engineering.

Jim Zuo received an NSF Career Award.

Ian Robertson's group received a Gold Trophy Award at the fall 2004 MRS meeting for their paper, "In -situ TEM Observations of Grain Growth in Nanograined Thin Films."

Clif Bergeron received the Greaves-Walker Award from NICE. The award honors a founding member and the first president of the National Institute of Ceramic Engineers (NICE). It is presented to an individual who has rendered outstanding service to the ceramic engineering profession and who, by life and career, has exemplified the aims, ideals and purpose of NICE.

Trudy Kriven was elected a member of the World Academy of Ceramics. The World Academy of Ceramics is located in Italy and joins internationally renowned individuals who have made a significant contribution to the advancement of the ceramics field. Prof. Kriven was elected as Professional Member (Academician) in the class of "Science" of which 26 members were elected in 2004 worldwide. She was recently issued her fourth patent, on high temperature tolerant ceramic composites having porous interphases.

Trudy Kriven

David Payne, Walter Klemperer, and their former Ph.D. students Jason Lee and Erik Mikalsen, were awarded a patent for a method for the deposition of ultrathin oxide films on semiconductors.

Abby Morgan, Ph.D. student in Russ Jamison's group, **Ranjeet Rao**, Ph.D. student in Jennifer Lewis' group, and **Robert Shimmin,** Ph.D. student in Paul Braun's group, have received 2005-06 Mavis Memorial Fund Scholarships from the College of Engineering.

Vassil Antonov won the Varian Award from AVS, and **David Xu** won the Silver Award at the fall 2004 MRS meeting. Antonov and Xu are Ph.D. students in John Weaver's group.

Yongqing Huang, Ph.D. student in James Economy's group, won a Gold Award at the spring 2005 MRS meeting.

Vinayak Raman, Ph.D. student in Pierre Wiltzius' group, received the 2005 Henry Ford II Scholar Award from the College of Engineering for outstanding graduate research.

Meena Babu received the 2005 Andrea Culumber Award from the College of Engineering.

Jonathan Hollander received a Churchill Scholarship for study at Cambridge.

Nicole Kwasigroch was named a Knight of St. Pat and received the 2005 Stanley Pierce Award from the College of Engineering.

Shawn Mack and **Phil Waggoner** received NDSEG Fellowships for graduate study.

The UIUC chapter of Keramos won the Mug Dropping competition at the annual meeting of the American Ceramic Society with two graphite fiber reinforced geopolymer mugs. The mugs were dropped from the 5th floor of the Baltimore Marriott hotel, which corresponded to the 8th floor in a normal building because the ballrooms and meeting rooms were twice as high as normal. This year UIUC also won the prize for aesthetics.

Lindsay Schubel, Keramos President

Recent Press

The French magazine Science & Vie highlighted **Jennifer Lewis'** work as a nanoscience image of the year, in their 2004 year-in-review issue.

John Rogers' research on nanofabrication of semiconducting materials was on the cover of Advanced Functional Materials (Jan. 2005). His work on 3D nanofabrication was on the cover of Materials Today (Feb. 2005) and was the subject of a research news article in OE Magazine. His work on molecular scale lithography was the subject of research articles in Small Times Magazine (Feb. 2005).

Steve Granick's research on a natural, pattern-forming process that could find use in fields such as nanotechnology and optoelectronics was mentioned on several online news sources including Innovations Report (March 2005).

Erik Luijten's work on modeling triblock copolymers was on the cover of the Journal of Polymer Sciences, Part B: Polymer Physics (April 2005).

John Weaver's work on surface modification of Si was featured in Surface Science with follow up commentary in Science, Physics Today and C&E News (May 2005).

Alumni Feature: Susan Plies (BS Cer '75)

Last fall the City of Wichita Falls recognized Susan Plies for being the first woman Glass Plant Manager in the U.S. Plies manages PPG's glass plant in Wichita Falls, TX. Below is an interview with Plies about her career and experiences in the glass industry.

Susan Plies

What sparked your interest in the glass industry?

At the time I was in college, there was some intriguing work going on with the recycling of glass, which interested me. I worked with Prof. Bergeron, who really triggered my fascination with the science of glass making. He was one of those instructors you remember and respect for the rest of your life. He was also helpful in my landing a summer internship with PPG in Mt. Zion, Ill. While there, I fell in love with the glass making process and the excitement of manufacturing.

What was your first job in the industry?

After graduation, my first job was with Johns Manville as a Research Engineer in the fiberglass business. That work was interesting, but not terribly satisfying to me. After a few years I moved to their Corporate Engineering group where I worked as a project engineer servicing several fiberglass plants. This was much more enjoyable to me and rekindled my desire to work in a manufacturing facility – so that is where I went next.

Were there other women engineers at that location?

There were no other female engineers working at my first job location. When I took the Corporate Engineer job, I was located at the World Headquarters, where I can remember one other female engineer. There may have been more that I was not aware of. The year I graduated from the U of I, only 3% of the graduating engineers were female, so there were not a lot of us out there - especially in the glass industry! I did not work with another female engineer in a glass plant until I got into a position where I could hire one.

"Being known as an Engineer from the U of I has earned a lot of respect for me over the years."

Was it difficult to obtain a promotion?

Any time I was put in the situation where I was working with a new group of people, I had to prove myself. Most men, and that was about all I worked with for the greater part of my career, had lower expectations of me because I was female. It usually did not take long for them to come to understand that being female did not significantly influence capabilities. The need to prove myself was more of an inconvenience than a problem. Over the years, as female engineers have become more common and respected, this bias has essentially disappeared.

How did your past jobs prepare you for your present position as plant manager?

I have had many different jobs and have worked for a few companies. They have all combined to provide experiences that prepared me for my current job. I am glad that I worked in the different areas mentioned earlier: R&D, corporate, and manufacturing. Also, I have had jobs (even as a young engineer) that required me to have a thorough understanding of the financial side of my business. I have also had opportunities to be involved in start-up operations. All of these things have been very helpful in giving my career a good foundation.

In addition to a successful career you have also raised a family of 3 children.

This is the one area where I felt that being female offered intense challenges. It was difficult, both physically and emotionally, to get the children ready every morning and leave them at daycare. It also made travel difficult, although I worked for some very understanding people that let me do what was necessary, including carrying babies around the country with me. For years, one of my biggest fears was that one of the children would get sick and I would have to miss work. I believed this made me appear to be a less reliable employee. When I became a widow, my role as mother presented even more challenges. I hope no one interprets this as advice to avoid parenting while pursuing a career. My work experiences have been very rewarding over the years, but they can't begin to compare with the exuberance of parenting.

What advice would you offer to those who are still in school?

Several years ago, PPG sent me to a course on understanding personality types and how to successfully work with different individuals. This was surprisingly helpful to me. Even when I was a young engineer, and preferred working with processes over working with people, I needed to be able to work well with all types of personalities in order to be successful in my job. This proved to be much more important than I ever suspected when I was studying calculus and physics. My son recently graduated as an engineer from the University of Texas and had an opportunity to take a class that included this training. I thought that was a great idea, and should be offered to all engineering students. Especially since so many of us are nerds at heart. To students considering a similar career: If you want to be a plant manager, you had better love the manufacturing environment, and I do. It is not attractive to everyone! Also, take

continued on next page

Plies Interview...

advantage of all opportunities offered you. I changed assignments every two to three years. When I started to get bored with a job, I let my manager know that I was satisfied with my position, but ready for a new challenge, should one become available.

What are your principal duties and responsibilities as plant manager? What provides you with the most satisfaction?

As a plant manager, I have responsibility for all of the production and personnel operations at my location. I still love being involved in troubleshooting production problems, but my role has changed significantly. I am getting older now, and I really enjoy working with the young engineers, trying to pass on some of the lessons I have learned over the years. A majority of my time is spent on the business side of our operation. It is my responsibility to be sure the plant pursues a course that assures the profitability of our business both now and many years into the future. Visualizing where a business can, and should, go is as challenging and fun as troubleshooting production problems.

I would like to add that being known as an Engineer from the U of I has earned a lot of respect for me over the years. I have also been fortunate to work for some very good companies, and have learned from working for at least one that was not so good. It is important to me that I am able to work for a company that shares my goals. PPG is an extremely ethical company and respects the role of scientists. It is a very good fit for me.

Obituaries...

Marvin Arthur Pohlman (BS MET '51), 76, died February 25, 2005. He was a metallurgist for several companies including General Electric and Nucor Steel. Following his retirement, he formed his own consulting company. Among his survivors in addition to his wife, Marian, are 3 daughters and 2 sons, 6 grandchildren, and 1 great-grandson.

Joseph Borrino (BS MET '52) died January 1, 2005, in Sun City, Ariz. He was retired from Amoco Research in Naperville, Ill. He is survived by sons David and Thomas.

Class Notes

1940s

Larry Gagin (BS CER '42) was selected for Who's Who in America 2005. After service in Europe as an army engineer officer, he was employed with Libbey and Kimble Glass divisions of Owens-Illinois, then 29 years in fiberglass with JohnsManville. Larry has served on four ASTM committees and has 18 patents on glasses and glass products. He has served in Bangkok for International Executive Service Corps. and worked in Europe, South America, Asia, and Canada on all kinds of glasses as a consultant.

1960s

Gerhard Persson (MS MET '61) retired in 1993 but has consulted in the quality management arena. His most recent consulting work was an international standardization (ISO) meeting in Kuala Lumpur. Gerhard and his wife live in Katrineholm, Sweden.

1970s

Thomas Miller (BS MET '79) and **Patricia Miller (BS MET '79, MS MET '86)** are the parents of Tom, who is completing his freshman year in MatSE at the U of I. Patricia is a technical manager for Bohler Uddeholm in Rolling Meadow, Ill. Thomas is vice president of manufacturing for Chicago Powdered Metal Products Company in Schiller Park.

1980s

Matthew Zaluzec (BS MET '84, PHD MATSE '91) has been promoted to manager of the materials research and advanced engineering department of the Ford Motor Company in Dearborn, Michigan. Matthew manages 55 people and is in charge of materials and the surface science and materials characterization groups. He and his wife, Michelle, live in Canton along with their son, Ryan and daughter, Erin.

1990s

David Teter (BS MET '90, PHD MET '96) works at Los Alamos National Lab as deputy group leader in MST6: Metallurgy. He recognized a few of his classmates in the Fall 2004 *MatSE Alumni News* "flashback" photo: Joel Lancaster, Britt (Hendrickson) Turkot, Laura McWhorter, Kok-Sin Koh, Dan Mateja, John Sacco, Mike Pershing, David Brecht, and Dave Forbes.

2000s

Dave Eddington (BS MATSE '00) and **Janice Lih Eddington (BS MATSE '00)**, celebrated the birth of their daughter, Kendall, on October 28, 2004. They reside in Boston, where Dave is completing his post-doc at MIT.

Bo (Bhavik) Patel (BS MATSE '00) runs a printed circuit board fabrication company in the northwest suburbs of Chicago called American Standard Circuits.

Yau-Ru Chen (MATSE '03) and **Tim Patz (MATSE '03)** are engaged to be married. Yau-Ru is currently finishing up her second year of an optometry degree at the University of Calif., Berkeley. Tim is employed with Edwards Lifesciences in Irvine. They plan a summer 2007 wedding and will make their home in Orange County, California.

We want to hear from you and find out what has been happening in your life. Please contact the Editor at brya@uiuc.edu or 217-333-8312. MatSE Alumni News is mailed twice a year and is also available on the web at www.mse.uiuc.edu/alumni.html.

"Alma Mater Illini"

Even the Alma Mater was wearing orange during the Final Four, as the campus celebrated the Illini men's basketball team's winning season. Do you have a photo from your student days that you would like to share?

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