

UNIVERSITY
OF DELAWARE

Alumni News

CHEMICAL ENGINEERING



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**AIChE
Delaware
Reception**
November 13, 2006
San Francisco, CA

NEW faces in ChE page 8-9

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WELCOME >>

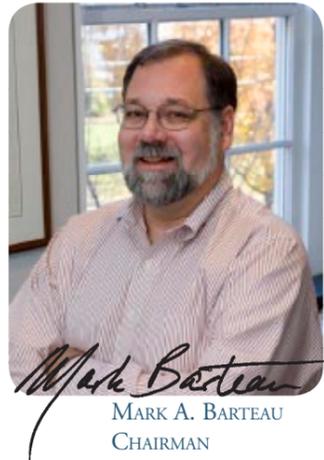
You are a very important part of our history and our future. Jon Olson, our Alumni Coordinator, will be glad to answer any questions or concerns you may have. Please feel free to contact him at 302-831-8472, or send an e-mail to alumni-news@che.udel.edu

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A LETTER FROM THE CHAIRMAN >>

WELCOME TO OUR 2006 NEWSLETTER!



MARK A. BARTEAU
CHAIRMAN

We hope that you will enjoy catching up on the activities of our department and our distinguished and far-flung alumni. If you haven't been in touch with us for awhile, we hope that this newsletter will entice you to reconnect.

In the category of new arrivals, we are delighted to welcome **Millicent Sullivan** and **Thomas Epps** to our faculty. Millie comes to us after a 3-year post-doc at the Hope Heart Program at the Benaroya Research Institute, after completing her PhD at Carnegie Mellon with Todd Przybycien. She will strengthen our growing efforts in the bioengineering arena. Millie and her husband Kevin Sullivan, MD, and newborn son, Liam, have purchased a house in Wilmington. Thomas Epps joins us from a nearly 2-year post-doc at the National Institute of Standards and Technology, after completing his PhD at Minnesota with Frank Bates. His specialty is polymers, and he is teaching in that area this fall. Thomas and his wife Gia are building a new house in Bear. You can read more about Millie and Thomas and their research later in this newsletter. If they sound familiar to you, perhaps it is because we hired both of them in 2004 and have been awaiting their arrival since. We are willing to wait when we find outstanding new colleagues, and needless to say, we have the highest expectations of their success!

Last year I mentioned our retreat to plot future directions for the department. We targeted two areas for special emphasis: Bio and Energy. While these are not unique, I am pleased to report that we have been moving forward, in part through the efforts of faculty working groups that have been initiated in each area. In the biological engineering area, we wish to build on the success of our biochemical engineering minor, launched in 2003. This minor already attracts more students than all other minors offered in the College of Engineering put together. A key limitation to expanding our research and course offerings at all levels has been the need to add faculty in this field. During the past year, the bio working group and the faculty search committee have worked closely with the leadership of the Delaware Biotechnology Institute to identify and recruit individuals of mutual interest. We hope that these efforts will bear fruit very soon. We are also looking forward to working with Professor **Daniel Hammer**, the chairman of the Department of Biomedical Engineering at Penn, who will spend his sabbatical year with us and will teach a course in Cellular Engineering this fall.

We have also been very active on the energy front. The energy working group organized a highly successful symposium on *Sustainable Energy and Chemical Engineering* in January that has provided important new directions and contacts. We are also crafting a minor in *Energy Technology and Sustainability* that we hope to put forward this year. A number of our faculty have been active in a new NSF-funded IGERT (Integrative Graduate Education and Research Traineeship) on solar hydrogen, centered in Electrical Engineering, and we are developing a proposal for an REU (Research Experiences for Undergraduates) program in energy and sustainability, as well as responding to a number of Department of Energy calls in hydrogen, fuel cells, catalysis, solar, bio-based materials and biofuels. We are also working on initiatives in energy and sustainability that go beyond department and college lines. This challenge, and the way that we tackle it, will define not only chemical engineering but our society for generations to come!

Energy issues also had a clear impact on this year's job market. While the pharmaceutical industry, which had been hiring increasing numbers of our graduates at all levels, hit a speed bump this year, the rest of the industry, and especially the petrochemical sector, more than compensated to make this a very good year. All signs are already pointing up for the class of 2007 as well. It will be interesting to see whether US industry rethinks its investment in research and the development of human capital. We are already hearing from companies about difficulties finding engineers with interests in traditional core subjects. At the same time, we have watched over the last decade as the

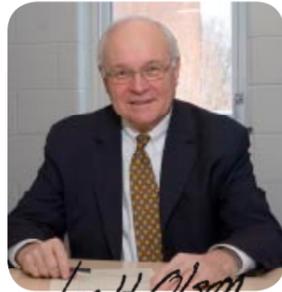
industrially funded share of research in our department fell to about 5% of the total, and total unrestricted industrial gifts to the department fell to four figures! We have worked hard to maintain enrollments at both the undergraduate and graduate levels, the former in the face of the increasing appeal of biomedical engineering programs and the latter in the face of an extremely competitive federal funding environment. The "contrarian" students who have invested their years of education with us will reap the benefits of their new found popularity with the chemical and energy industries, and the department should maintain its reputation as one of the top producers of chemical engineers at all degree levels.

While chemical engineering at Delaware and elsewhere has a well-deserved reputation as the most demanding major, it's not all work and no play! This past year, **Stan Sandler** launched our first ever study-abroad offering in chemical engineering. You can read more inside, and as the accompanying pictures show, the students found time outside the lab and computer room to explore "down under." The feedback from the participants was extremely enthusiastic, and this winter two dozen students are planning senior lab and product design courses at the University of Melbourne, again under Stan's leadership. We hope to make this a regular offering accessible to all our students, but for now we are still in the feasibility demonstration and learn-by-doing mode. Ensuring continuing faculty, administrative and financial resources will be important for future success. And while we love to hear from alumni, please forego the temptation to e-mail me a question about why we didn't do this when you were a student. We ALL wish that we could have done this (or could be 21 again and on the beach in Australia!)

On a more somber note, we mourn the passing of Professor **Arthur B. Metzner** on May, 4, 2006. **Jon Olson** has written a memory of Art in this issue that captures much of Art's influence as a colleague, educator, leader, editor, etc., but most of all something about the man. The AIChE is planning to publish oral histories of outstanding leaders of the profession as part of its upcoming centennial celebration. Art finished the final edits to his only a few days before his untimely death, and we feel very fortunate to have captured his perspective on his very rich and accomplished life. Jon's article reveals Art's ability to gently lead others, whether students, colleagues, or administrators, to make good decisions. I can contribute a small personal anecdote. I recall having lunch with Art a few years ago, and fulminating about the "embellished" data that some competing institutions were supplying to various bodies that produce college rankings. I wondered aloud whether we should do the same to level the playing field. Art remarked simply that I had been well served by integrity thus far, and might want to consider whether to abandon it so lightly. He was right, of course. In contemplating since the successes and failures of those in leadership roles, myself included, it is clear that integrity is at the very core of essential characteristics. What I remember about Art was the way that he communicated this message, not as a sermon about high minded principles, but as a bit of gentle and pragmatic advice that was much more likely to be absorbed. I am certain that many of Art's students, friends, family and colleagues can recount similar stories of his quiet but profound influence. We miss him indeed.

COMMENTS FROM THE ALUMNI COORDINATOR >>

My comments this year are divided into three parts: first, a brief enumeration of the major prizes won by our alumni, a description of the very successful winter term program in Australia, and finally a tally of placements of our graduates.



Jon H. Olson
JON H. OLSON
ALUMNI COORDINATOR

Dr. Robert Gore, B59, was the recipient of the 99th Perkin Medal from the Society of Chemical Industry and also was inducted into the National Inventors Hall of Fame. Bob developed expanded PTFE which now is found in many products including GORE-TEX®. The invention depended on finding a prototype way to expand Teflon® tape and then refining this method to meet the material needs

of many products. A more complete description of Bob's career will appear in an AIChE publication celebrating the 100th anniversary of the institute.

On behalf of **J. Larry Duda**, M61, PhD63, the Dow Chemical Co. made a \$2 million donation to Penn State called the Larry Duda Excellence in Chemical Engineering Fund. Larry worked for Dow from 1963 until 1971 when he went to Penn State. He served as chairman there from 1983- 2000. Larry continued a very successful consulting practice with Dow for his entire career, and this award is in recognition of his many contributions.

Rakesh K. Jain, M74, PhD76, is the Andrew Werk Cook Professor of Tumor Biology, Harvard Medical School. He received the Academic Scientist of the Year Pharmaceutical Achievement Award and the Outstanding Achievement Award from the Society of American-Asian Scientists in Cancer Research. Rakesh's biography also will appear in the AIChE 100th anniversary publication.



Arup Chakraborty, PhD89, is the Robert T. Haslam Professor of Chemical Engineering, Professor of Chemistry, and Professor of Biochemical Engineering at MIT. He was awarded the 2005 Presidential Citation for Outstanding Achievement from Delaware. He is a member of the National Academy of Engineers where he was recognized for "his accomplishments in applying theoretical chemistry to practical problems in immune system recognition, polymer interfaces, sensor technology and catalysis".



T. W. Fraser Russell, PhD64, Allan P. Colburn Professor, was inducted to the UD Wall of Fame. His citation noted that he developed the undergraduate summer research program, was VP for Research and the Director of IEC from 1979 to 1996. His career also was honored with a description of his career in the *University of Alberta Engineer*. The article revealed that as a rising senior Fraser turned down a summer job as a life guard at the Banff Springs hotel in favor of a job at the British American refinery. A film, *The River of No Return*, starring Marilyn Monroe and Robert Mitchum, was filmed in Banff that summer. The life guard who replaced Fraser was hired to teach Marilyn how to swim. "It was the biggest mistake of my life." The rest of the article was serious.

Levi Thompson, B81, is now the Richard E. Balzhiser Collegiate Professor of Chemical Engineering at Michigan where he earned his masters and PhD. Levi was awarded a UD College of Engineering Outstanding Achievement Award. As stated in the citation, his "...research areas include nanostructured catalysts, micro-reactor and micro-fuel cell systems, and hydrogen technologies. Author or co-author of more than 200 papers and presentations, he has also been awarded 10 patents, and leads a multi-disciplinary team developing compact devices to convert gasoline into hydrogen."

For many years chemical engineering undergraduates have hoped for a program abroad in chemical engineering during the winter term. In cooperation with the University of Melbourne this year Stan Sandler and Dave Short developed, organized and delivered this wish. The Senior lab course used the Melbourne unit ops equipment during their summer recess. Twenty seniors participated with great enthusiasm and gusto. (Please read Ray Dagastine's [B 97] comments in the alumni notes section for his take on "gusto".) About one week of the term was open for travel, and the group went to Sydney and Cairns. This successful experiment will be repeated in the 2007 winter term.

For the last five years the job market for seniors has been soft, and in some years very soft. This year was an exception; hiring was fairly strong. Gore hired five of the seniors, a new high for them. Awash with cash and beset with an aging technical staff, the petroleum industry was hiring aggressively. Boeing hired two seniors who made their initial contact at the fall job fair. On the negative side, there was much less hiring by the pharmaceutical industry and placements in the chemical industry also were diminished. Most of the seniors were proactive in their search for employment, and these students had firm job offers with attractive salaries by the end of the fall term. However, about a fifth of the class elected to wait until late spring or graduation before starting to hunt for employment. These individuals are not being as successful as their early bird brethren.

Nine of the seniors are going directly to graduate school. One is remaining at Delaware to earn a PhD in biochemistry and a second plans to earn a PhD in biophysics at Boston U School of Medicine. The remaining seven are headed for PhDs in chemical engineering in very strong schools, Illinois, Penn, Penn State, Princeton(2), MIT and Texas. Geoff Oxberry distinguished himself by earning a BChE and a MChE in four years and snagging a Goldwater scholarship. Our opportunities for undergraduate research provide rich preparation for graduate work.

There is an undercurrent of anxiety on the future for chemical engineers. Thomas Friedman's very popular book, *The World is Flat*, suggests that skills in analysis, design and invention now provided by US engineers will be taken over by less expensive but equally competent overseas providers. We need to prepare our students for a much less stable employment market and to pay proper attention to the development of "people skills". Such training is hard to quantify in an engineering education but surely is important for a successful career.



AIChE Reception

Delaware Alumni Reception

Monday, November 13, 2006

7-9 p.m.

The AIChE 2006 Annual Meeting
San Francisco, California

www.aiche.org/Conferences/AnnualMeeting/index.aspx



For UD Alumni Event info
call: 302-831-2341 or
visit: www.udel.edu/alumni/events/

MILLICENT O. SULLIVAN

2006 Post-Doctorate - Hope Heart Program at the Benaroya Research Institute

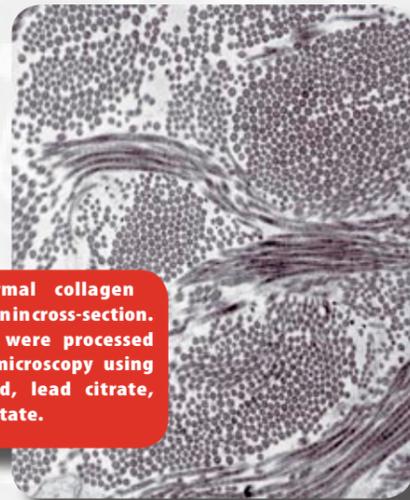
2003 Doctorate - Carnegie Mellon University

1998 Bachelors - Princeton University



I became interested in the chemical engineering department at the University of Delaware because of its excellent reputation, its commitment to teaching, and because I felt that my research could complement and be complemented by the other research efforts in the department and at the university. I am interested in the design of polymeric and colloidal materials for gene and protein delivery; in the extracellular and intracellular transport of those materials during delivery; and in the use of biomaterials as tools for probing the interactions of cells with their extracellular environment. The department's expertise in polymer materials and rheology, and its growing commitment to biologically oriented work were strong factors in my decision. When I visited the department, the collegial environment and healthy interactions between the faculty, staff, and students sold me on coming here."

Murine dermal collagen fibrils are shown in cross-section. Skin sections were processed for electron microscopy using ruthenium red, lead citrate, and uranyl acetate.



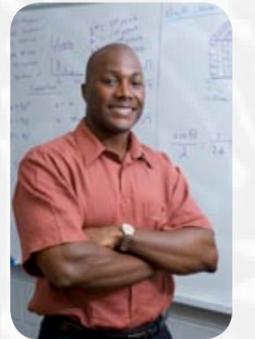
THOMAS H. EPPS, III.

2006 Post-Doctorate - NRC Postdoctoral Fellow - NIST

2004 Doctorate - University of Minnesota

1999 Masters - Massachusetts Institute of Technology

1998 Bachelors - Massachusetts Institute of Technology



My group's research is focused on designing novel nanostructured materials for fuel cell, lithium battery, and analytical separation membranes; biological and chemical sensors; nanoporous templates and precursors for electronic arrays. We believe block copolymers are ideally suited for these applications because they provide the opportunity to design materials with attractive chemical and mechanical properties based on their ability to assemble into periodic structures with nanoscale domain spacings. In addition, modern polymerization methods afford access to an array of block copolymer architectures, ranging from two-monomer diblocks to branched configurations that may incorporate almost any number of different polymers.

and other defects, and understanding thin film behavior.

Using anionic and radical polymerization techniques, we synthesize the appropriate polymer systems necessary for the efficient and detailed study of critical block copolymer phenomena. We then examine block copolymer behavior using various analytical techniques available at the University of Delaware, including, x-ray scattering (SAXS, WAXS), electron microscopy (TEM, SEM), optical microscopy (birefringence), scanning probe microscopy (AFM), dynamic mechanical analysis (rheology), and spectroscopy (XPS, FTIR)."

We manipulate block polymer internal and external interfacial characteristics in bulk and thin film environments to influence the ordering and stability of polymer structures. By controlling polymer self-assembly, we will enable the wide-spread use of block copolymers for the above-mentioned applications and overcome several current limitations such as: predicting multiblock polymer phase behavior, inducing long-range order, eliminating grain boundaries



Atomic Force Microscopy (AFM) image of crystallites from a poly(isoprene-*b*-styrene-*b*-ethylene oxide) ultrathin block copolymer film, flow-coated onto a surface modified silicon substrate. Image was the featured picture for June 2006 in the Veeco SPM calendar.

NOT ALL WORK >>

*CHEG 445 - CHEMICAL ENGINEERING LABORATORY II AND
CHEG 467 - EXPERIMENTAL PROCESS ENGINEERING*



An experiment on teaching the Senior Laboratory class was performed during the 2006 Winter Session. The class was taught in the undergraduate laboratories of the University of Melbourne in Australia. Twenty seniors, about 40% of the class, made the trip. Stan Sandler had coordinated

the arrangements and Dave Short accompanied the students on their travels. Stan taught the Senior Lab class while Dave taught a class on Advanced Flowsheet Modeling. All the students thoroughly enjoyed the experience. The two classes were taught during the three weeks in Melbourne.



The remaining time was spent in Cairns and Sydney. In Cairns, trips were made to the Great Barrier Reef and the Kuranda Rain Forest. In Sydney, the students engaged in a variety of activities ranging from tours of

an oil refinery and a specialty chemical plant to swimming at Bondi and Manley beaches to attending a performance of 'Madame Butterfly' in the Sydney Opera House.



Check it out! www.che.udel.edu/CHEG/



GO FORTH AND MULTIPLY! >>

A group of alums from the era 1988-1992 met with their children at Dave Lafyatis' home in early November 2005. With Bruce Robertson's help, the adults are identified below. The beautiful children in the foreground can be identified by contacting their parents. Obviously a good time was being had by all!



A photo from a recent party held at the home of Dave Lafyatis. It's a collection of about 13 UD alums and all their children. Most graduated from the PhD (or BS or MS in a few cases) program between 1988 and 1993-4 era. Alums in the picture include: Andy Wang, Tom Petti, Natalie (Schwalm) Petti, Dan Cassidy, John Sullivan, Mike Sowa, Kevin Buzdygon, Maureen (Steg) Buzdygon, Dave and Jessica (Reinkingh) Lafyatis, Jim Lertola, Scott Punell, and Lynn (Kelsey) Tracey.

Four married couples (Buzdygon, Petti, Lafyatis and Robertson) met in the UD ChE department and got married. Bruce Robertson's wife Terri was working in ChemE in the accounting office for a summer job when they met.

-Bruce C. Robertson, Ph.D., Managing Director, H.I.G. Ventures

1950's

Bob Otto, PhD57, described his latter career as follows: He retired from Monsanto in 1991 and set up a "single shingle" consulting practice as Reo Associates (REO are his initials.) His work was mainly in process control. He also noted that he was one of Art Metzner's first PhD students. He has not seen other Delaware chemical engineers for some time.

A press release announced the appointment this year of **Edward Grochowski**, B59, as the Executive Director of IDEMA (International Disk Drive Equipment and Materials Association). Ed retired from IBM in 2003 and lives in San Jose, CA. He earned a MS in chemical engineering at Michigan in 1961 and a PhD in chemical and material engineering from NYU in 1971.

"Dr. Grochowski began his career at IBM in New York where he helped develop the company's microelectronic silicon activity and later joined IBM in San Jose where he held technical and management positions, including participating in storage research at the Almaden Research Center.

Dr. Grochowski has filed nine patents and has authored numerous articles on semiconductor processes, magnetic hard disk drive, storage trends, computer storage technology, and nanostructures for storage."

Appropriate to a very hot research area, **Rajai Atalla**, M56 PhD61, was one of three principals at a DOE sponsored workshop, "Breaking the Biological Barriers to Cellulosic Ethanol: A Joint Research Agenda". The workshop was held Dec. 7-9 in Rockville, MD. Rajai is now Professor and Senior Scientist at the US Forest Service facility in Madison, WI. At Delaware he studied the spectroscopy of flames. He next was at the Hercules Research Center for eight years where he studies the phase transitions of semicrystalline polymers. He also linked the anomalous proton NMR spectra of alkyl phosphito hydrides to fluxional molecules. Next at the Institute of Paper Chemistry, he and David VanderHart used C13 solid-state NMR to show that native celluloses are composites of two forms, I_α and I_β. In 1989 he became head of chemistry and pulping research for the USDA Forest Service. There he developed inorganic analogs of lignin peroxidases for use in liquid effluent free pulping and bleaching. He currently is studying the molecular structure of plant cell walls with emphasis on secondary walls and native celluloses.

Rajai and his wife **Dorothy**, AS62, live in Verona, WI. They have two children.

The April 2005 issue of Prism, the Journal of the Am. Soc. for Engineering Education, had an article, "*Why more engineering deans are moving into the provost's office*", which featured **John Anderson**, B67. John moved from dean of engineering at CMU to Provost and Academic Vice President at Case Western Reserve in 2003. The article included six engineering deans who have made this transition in the last five years, and while this transition is not yet a trend, it is happening more often than in the past. The pluses for engineers as provosts are skills in problem solving and comprehensive understanding of budgets. The minuses are the need to develop a different set of communication skills.

For example John moved from a budget of \$90M at CMU to \$700M at Case Western. He had to solve the "small" problem of a \$40M shortfall, and in doing so, found that the relatively small faculty of Arts and Science were sufficiently upset with his solution that they passed a no confidence resolution of the University's president and Vice President Anderson. Obviously the A&S ox was gored. Anderson went on to say, "Engineers tend to be more direct in how they express themselves..." than non engineering faculty. "You have to be mindful of how people in the arts and humanities view what you say. When I say something, it might be interpreted differently by people outside of engineering."

It's not an easy job being a provost, but John Anderson has made the step from dean to provost successfully. Long hours, lots of meeting, tons of e-mail: good luck, sir.

1960's

J. William Breen, BA & BChE68, described his career as follows: I started out in MATH and transferred into CHEG in my third year; Dr. Russell taught Industrial Stoichiometry. As described by him, after that intro course, there would be dual tracks, one math-oriented (which I did better in), and one chemistry oriented (the opposite). Then it would all come back together in the last year. Dr. Metzner was my senior thesis advisor, "Forced Convection Boiling of Viscoelastic Fluids." By the time the apparatus was built, I was a certified plumber.

Since graduating UD I went on to get an MBA from Wharton in 1971 then was with the chemical division

of Westvaco for 25 years, about half as their M&A guy acquiring complementary companies and businesses. This led to doing an LBO of one of their plants in central Florida in 1997 which we sold in 2003, now www.am-cc.com.

Since then I have joined an investment banking boutique based in Bethesda MD, www.nationalcapital.com, which is forming a merchant bank and acquiring funds. His title is Executive Vice President; Managing Director, Chemicals Group.

He responded to my comment on banking, "You've had an interesting career and I wish you well in the role of banker - pin stripe suit, polished shoes, tie and a fresh haircut. Plus all of the stress of the material balance of money," with a better description:

"Investment banking as practiced by semi-retired guys like me is done in a bathing suit walking on the beach with a cell phone in one hand and a blackberry in the other."

Kenneth Porteous, PEng, M69, PhD71, in thanking Art Metzner for the condolence note sent on the death of Ken's father, enclosed a brief description of engineering registration in Canada. Ken is currently the Vice President of APEGGA (Association of Professional Engineers, Geologists and Geophysicists of Alberta), which has 35K professional members in engineering and geosciences.

In Canada engineering is a self regulated profession, and each province/territory has a professional association which regulates...engineering, geology and geophysics...under government legislation. All persons representing themselves as engineers, not just consultants...must be registered as a PEng or as EIT (Engineer in training), who work under the supervision of a PEng. The definition of practice includes teaching engineering at a university, so faculty members must be registered. (Please note that Ken displays PEng in his degree list. At Delaware only a few of the CHEG faculty are registered.)

Ken is the Associate Dean (Student and Co-op Services), Faculty of Engineering, University of Alberta. The Faculty has approximately 3300 undergraduate students and 1100 graduate students across nine engineering disciplines. Art Metzner and Fraser Russell are alumni.

1970's

Bob Raffa, B71 (and an AB in Physiological Psychology), dropped in Colburn Lab this summer. He had not been back since graduation, and was particularly eager to see Fraser Russell. He gave his latest book (*Drug Receptor Thermodynamics*) to Fraser with the inscription, "Best regards to one of my best and most inspiring teachers! Thank you! Bob Raffa." While Bob gained a clear grasp of the fundamentals of chemical engineering, he found the process design and specification aspects uninteresting. He found intellectual relief in physiology.

Bob is now professor and chairman of the department of Pharmaceutical Sciences in the School of Pharmacy at Temple. His path to this position came about from taking a course on pharmacology with Robert Tallarida, who described the limiting uptake of drugs via thermodynamics and the rate of uptake and removal via mass transport formulations. From his training in chemical engineering, Bob Raffa found these approaches clear and appealing. Bob earned a MS in Biomedical Engineering at Drexel under Tallarida's direction. He followed Tallarida to Temple for his PhD in pharmacology. Bob then had a series of research postings at Temple Med, Jefferson Med, McNeal Pharmaceutical, Jansen Research Foundation, and the R.W. Johnson Pharmaceutical Institute. He joined Temple in 1996 as an associate professor, became professor in 1999 and chairman in 2004. Bob has an active and well funded research program. His interests are analgesics, theoretical pharmacology, synergistic drug interactions, and the thermodynamics of the drug-receptor interaction. A much more complete description is available on his web page, www.temple.edu/pharmacy/rraffa.

When **Bill Fitzharris**, B73, PhD78, was asked about his career at Amoco, BP Amoco, BP Oil (Amoco was taken over by BP), he replied with the following list of job descriptions and titles: Engineer, (Heavy Oils Cracking/Hydroprocessing), Refining Technology, six years. Superintendent and then Operations Coordinator, Refining Operations, six years. Supply Manager, Operations Management, two years. Manager of Re-Engineering, Crude to Cash Value Chain, three years. Strategic Planning Manager, Supply, Trading and Marketing, three years. Manager, Supply Trading, and Business Development, three years. Manager of Trading, Financial and Cash Flow Optimization, three years and currently, General Manager (Hydrogen for Transport), Global Technology for Refining.

"From the last item, you can see that we are looking at possibly moving to a non-gasoline transit system--what it will cost, what it will take, what changes will be required."

Bill and Cynthia (Fanning) Fitzharris, AS73, live in Naperville, IL. They have two children, Elizabeth and Katharine. Bill dropped by this spring on his way to a wedding in Dover.

On May 8th Lyondell announced the appointment of **David Prilutski**, B75, as vice president and as president of Lyondell Europe. He also will have global responsibilities for styrene and isocyanates. Previously he was director of supply chain operations. Prior to 1999 Dave's career was with Arco Chemical, which was acquired by Lyondell that year. Lyondell is a global chemical company with manufacturing sites on five continents and 10K employees. They are a producer of ethylene, polyethylene, propylene, polypropylene, propylene oxide, styrene, acetlys and TiO₂. On a personal note, David also earned a MBA from Drexel in 1980. He and his wife, Eileen, have two children, Katherine and Megan. They are currently living in Houston but anticipate moving to Europe.

Betsy (Bontempo) Meyer, B77, is working for Sasol Olefins and Surfactants in Bad Homburg, Germany this year. Sasol O&E is being prepared to be sold. She and her husband, Eric, plan to return to Houston, TX after the sale is complete. Her career spans work with Conoco/Vista/CondeaBista/Sasol, and at Sasol she is one of the financial controllers (material balance of money). They have three children, Joey studying Mech E at Maryland (Eric's school); Amy, a senior in architecture at Penn; and Melissa, a tenth grader with them in Germany. Betsy and Eric got to see Amy play volley ball against Delaware in Newark and walked through the "new" Colburn lab. None of her children liked chemistry, and hence chemical engineering was a path not followed.

She stays in touch with Linda Justice Myrick and Joanne Stallman Guempel but hasn't seen them for a few years. Her e-mail address in Germany is Betsy.Meyer@de.sasol.com.

1980's

Moris Amon, PhD82, wrote: "After 11 years in process and product R&D at Mobil Chemical, Films Division, I joined Avery Dennison's Engineered Films Division in 2002. For the last three years I have been leading EFD's product development efforts in the field of polymeric films for label and sign applications. My wife and I, both UD graduates, were very pleased that our older son, Avi, was awarded a DuPont Memorial Scholarship in 2004. He

is in the Lerner School of B&E majoring in Economics and in A&S majoring in History with minors in Jazz Studies and Philosophy. A second son is at Princeton, and our daughter is in high school."

Phillip Savage, PhD86, M83, was awarded the Rackham Distinguished Graduate Mentor Award at the University of Michigan. Phil's mentoring abilities have won him this award, which honors tenured faculty who mentor students through professional training in a multifaceted partnership sustained by mutual respect and concern. He offers his students both the freedom and opportunity to develop their professional and personal skills.

Marsha (Stalker) Bischel, B87, also has a 1997 PhD in materials science from Delaware. She describes her professional activities as follows:

- Continue to work for Armstrong Building Products as the only material scientist in the organization.
- Invited to present a paper, "The Environmental, Health and Safety Aspects of Acoustical Materials", at the fall (2005) meeting of the Acoustical Society of America.
- Continue to lecture the first year students in the Winterthur – UD program in art conservation.
- Serving as the chair of the Student Activities and Outreach Committee for the south central PA chapter of ASM International. This includes judging at the local science fair to give awards for excellence in material science.

Kun Hong Lee, PhD83, wrote Mark Barteau about his new position in Korea: "I was appointed as the director of National Center for Nanomaterials Technology (NCNT) as of September 16th, 2005. Although I still keep a position of professor, it is a full-time job. I have to construct \$50M building and am in charge of \$50M equipment purchases. The project will last until the end of August, 2009. The NCNT houses a large clean room (more than 20,000 square feet), and can provide state-of-the-art microfabrication equipment and services to academics and industries (semiconductors and displays). We plan to complete the building construction by the end of July, 2006. User service will begin from January, 2007 after several months of equipment commissioning period.

My daughter went to Berkeley, and she is now a junior student in biochemistry. My son became a freshman in Marshall Business School (undergraduate) at University of Southern California. My wife still lives in Irvine, CA to take care of my son."

Here is a well-written PR statement about **Bruce Robertson**, PhD89:

H.I.G. Ventures Adds Bruce C. Robertson as a Managing Director...H.I.G. Ventures, the venture capital affiliate of H.I.G. Capital, a leading private equity and venture capital investment firm headquartered in the Southeast United States announced today that Bruce C. Robertson will be joining the firm as a Managing Director. Dr. Robertson will focus on life science investments for H.I.G. He will be based in H.I.G.'s Atlanta office.

H.I.G Ventures invests nationally in market-leading companies and will benefit from Bruce's well established relationships in the biotech-rich mid-Atlantic region, where he has been based since 1988. Dr. Robertson's venture capital investment experiences include his most recent role as a Managing Director with Toucan Capital. Prior to Toucan, he was a General Partner at GIV Venture Partners in Vienna, VA. Dr. Robertson previously had gained over a decade of combined industry experience. Prior to GIV he was the Director of Business Development for IGEN International, a biotech company acquired by Roche for \$1.4 billion in 2003. In addition, Dr. Robertson held a variety of technical and strategic management positions at W.R. Grace & Co., including the head of technology and planning, and manager of several research and engineering groups.

In announcing the addition, H.I.G. Capital Managing Partner Tony Tamer commented, "We are very excited to have Bruce join our team. He brings a wealth of experience and relationships to H.I.G. in the life sciences sector."

Dr. Robertson earned his undergraduate degrees in Chemical Engineering and Mathematics from the University of Pennsylvania and his PhD in Chemical/Biomedical Engineering from the University of Delaware. He received his MBA from Harvard Business School.

Bruce put the same information less formally as: Bruce Robertson recently joined H.I.G. Ventures as a partner in their Atlanta office. H.I.G. Ventures is the venture capital affiliate of H.I.G. Capital, a \$3 billion investment firm headquartered in Miami. Bruce focuses on early stage investments in biotechnology and medical devices. Bruce made the move to H.I.G. after spending several years with Toucan Capital in Bethesda, Maryland. Prior to that he founded GIV Venture Partners, a VC fund focused in emerging markets like India and China. Despite the business move to Atlanta (where he commutes weekly -- ugh), Bruce still lives in Potomac, MD with his wife Terri and two children (Christian, age 12 and Petra, age 7).

1990's

Sarah Bannister, B95 writes: "Job news: I've accepted a job with Covington & Burling here in DC. It's the oldest law firm in DC and has the type of old-school tradition and devotion to excellence that I enjoyed during my time at DuPont (it even has the wall with pictures of dead white male partners!). The lawyers are top-notch personally and professionally, and I'll learn a lot in the next few years. I'm still undecided about practice areas. Patent law is off the table, but food and drug law is a possibility, as is corporate work in life sciences (C&B has the top FDA and life sciences practices in the US). This might be a nice way to blend my chem eng/biotech background with the law. I'm also interested in international law and policy and cultural property issues. The beauty of C&B is that it is a large enough firm that I will be able to put together a practice area that interests me.

School news: I graduated on May 21 (woohoo!), then immediately began studying for the NY bar (booo!). I've had a good year of publications - three law journal publications! I'll send you a copy of my published Note- my thesis is that science and engineering graduate students should be treated as employees under the National Labor Relations Act. It was therapeutic to write! My moot court partner and I also just won the National Native American Law Student Association Moot Court competition and will have our brief published. I took Indian law last semester, so this was an interesting way to explore the curlicues of this very rich area of law.

So, where does this leave me? I'm glad I came to law school, and I'm glad that I traveled through chemical engineering to get here. I'm giving myself a 5-year period at C&B to figure out what I want to do with my professional and personal lives. I could see moving to a nonprofit, especially one dealing with HIV/AIDS and/or international women's rights, in a few years- maybe giving away Bill Gates's money :). I took a great negotiations class, and my instructor urged me to consider exploring becoming a mediator or conflict management design, which could bring me back to the international policy work that I love. I have also become fascinated by China and would love to get over there to work for a bit (need language skills first). I guess I'm still searching for how I can make a difference in this world."

Scott Sills, B95, started his career as a process engineer in the FMC coke plant in Kemmerer, WY. After four years he moved to the University of Washington for a PhD.

His dissertation work gave him a natural transition into a post doc with IBM where he "...was working on characterizing charge transport in organic electronic devices and nanoparticle filled polymers) using scanning probe techniques like conductive probe AFM, EFM, and Kelvin probe force microscopy."

This spring Scott moved on from his post doc with IBM San Jose to Micron Technology in Boise, ID. "My focus is on developments in photolithography, where my background in polymer physics, interfacial science, and nano-stuff applies to the photoresist aspect of the process. ... I'm still working through a steep learning curve. ... There is a lot of interesting science & engineering involved - more D than R, but I enjoy the challenges of both."

Scott married Amanda ("Mandy") Lee Sills in 2001. "After working full time and taking college classes part time for a couple years, she will be going to Boise State University (BSU) full time to finish her Bachelors in Biology. She had been working in microbiology labs for ~8 years (lab. tech. plus some development work) & received a full academic scholarship at BSU! She also enjoys having her own personal tutor for math and chemistry."

Scott lost his foot in an incredible kayaking adventure in Washington's Cascade Mountains.

When asked how he was doing physically, in May Scott replied: I just rode (bicycled) in from work - its about 11 miles each way & I've been riding usually four days a week, so the physical aspect is well (some frustrating issues from time to time, but overall well). I managed to fit in two river trips between jobs: a six day - 100 mile trip on the Grande Ronde in N.E. Oregon (I kayaked & my buddy rowed a raft with the camp gear) and a four day, 70 mile trip on the John Day River in N.C. Oregon (my wife and I both kayaked with minimum essentials stowed in our kayaks). Life on the river was grand.

XiaoFeng Wang, M95, PhD95 described her current work as follows: Recently I left Centocor for Novartis. Currently I am in Clinical Pharmacology at Oncology Business Unit, and my title is Senior Fellow. My responsibility is to support clinical trial study design (from Phase I to Phase III), and to support drug registration, submission, and filing. I have been working in this field since completing my post

doc. Novartis is in the old Exxon Research and Engineering campus in Florham Park, New Jersey. It is an unbelievable coincidence that Ken Bischoff received an award from Exxon in 1980's in my building.

Application of PK/PD (PharmacoKinetics and Pharmacodynamics) modeling/simulation to clinical trial design started about eight years ago. Initially people in pharmaceutical industry did not appreciate the difference between "modeling" and "simulation". It took about five years gain acceptance of modeling/simulation as a tool for clinical trial design. Today, the majority of large pharma or biotech companies have a modeling/simulation team within clinical pharmacology department or as a separate supporting group. Modeling/simulation today is used not only to improve clinical trial design, but also for filing, where drug labeling (dose adjustment based on body weight, gender, renal/liver function, and special guidelines for pediatric patients) is a critical issue.

It is very difficult to find people competent in modeling/simulation. Most people working in this field were trained either in mathematics/statistics or pharmacology. The former don't do mechanistic modeling, the later doesn't use mathematics, and neither group know process analysis. While I was working for Centocor, I was invited to give a talk about PB/PK modeling to Johnson&Johnson worldwide. People were very impressed by my presentation. When asked why I can handle modeling issues easily, I always say in that the training I got at UD was excellent. In fact, the modeling techniques are not new, and were developed by Ken Bischoff back in the 60s and 70s. (Ken Bischoff was XiaoFeng's PhD advisor.)

Kathy (Card) Beckles, B97, started her career as a supervisor for Frito-Lay, then attended George Washington Law (2002) and is now Vice President of the Intellectual Property Department at JPMorgan Chase in NYC. "Mostly I handle the patent prosecution, litigation and licensing in our Wall Street office. It is a big change from my hard hat and steel toed boot days at Frito, but most of the same lessons still apply."

She and her husband, Kevin Beckles live on upper Madison Avenue. She keeps in touch with **Terri Jeffries**, B99, and **Heather (Hollowell) Davis**, B97. Much to their credit as recent graduates, the three support the TEHEKA scholarship (TErri, HEather and KAthy), awarded for the last two years on Honors Day.

The April 24th issue of CEN had an extensive article on the animated cartoon, "*Riding Snowflakes*", the first of a series that are being presented in the US planetarium circuit.

Shekhar Garde, PhD97, is one of three principals in the development of the program. "*Riding Snowflakes*" features "Oxy", the oxygen atom, "Carbón", the carbon atom, and "Hydro" and "Hydra", the diminutive hydrogen sidekicks. The purpose of the series is to introduce chemistry to young children with very high quality animation, professional actors, skillful writing and chemical accuracy. Shekhar is a professor of chemical and biological engineering at RPI.

Ray Dagastine, B97, describes being in Melbourne: I am a senior lecturer (similar to an assistant prof. in the US system) in Chemical and Biomolecular Engineering at Melbourne. I finished my bachelors in 97 with distinction at UD. I did my senior thesis on composites working for Roy McCullough. I did my PhD at Carnegie Mellon University on colloidal forces related to both dispersions and emulsions under the supervision of **Dennis Prieve** (UD, PhD 1973) and Lee White (applied mathematician originally from the University of Melbourne).

I originally came to Melbourne 4 years ago on an NSF international post doc fellowship to study emulsion behavior with the Particulate Fluids Processing center. This is an interdisciplinary center across chemical engineering, chemistry and mathematics. I have been in my chemical engineering position for the last two years. My research is in the areas of colloids, emulsions and complex fluids. Some things are still getting started, but things are pretty exciting. I just had a paper come out in **Science** in the July 14th issue.

After the first two years here, my wife and I liked it so much that we looked into finding a permanent position for me, and Melbourne decided they would have me. My wife, **Ellen (Levy) Dagastine**, (Bach of Business - UD, '96, we met at UD and were married in 1999) had become the store manager of an IKEA here. She worked for IKEA when we lived in Pittsburgh and transferred when we moved to Australia. She's now the deputy store manager of their other larger store in Melbourne.

[In January 2006 Stan Sandler and Dave Short offered a winter term program at Melbourne. The program offered CHEG 445 and 467, and 20 UD seniors attended. Ray also commented on this.] I thought the winter session for

senior lab was a great program. The students certainly had a lot of fun, managed to see an awful lot of Australia, and get their work done. I thought the exposure to a different lab and department was quite exciting and we made sure that a number of students took them around town. By the end of their visit I think they knew both how to use laboratory data to design equipment and where some of the best night-time hot spots where in Melbourne! They also heard about the history of the department and Melbourne and to see lots of Australian animals.

Hank Ashbaugh, PhD98, was about to begin his second year as an assistant professor at Tulane when Katrina hit. Actually he was in Florida visiting his father and suddenly found that communication with the university and particularly his new graduate students was impossible. Hank reached these students through their undergraduate institutions. He was able to get them paid without interruption and to find temporary admission for them at Texas Tech and Houston. Tulane was shut down for the fall term and incurred a loss of about \$250 million. In reopening Chemical Engineering was moved into a school of science and engineering. Recruiting for this fall was good, and the department is moving on with upbeat determination. Hank spent the fall in a sabbatical leave at RPI, a creative solution by Tulane for continuing his employment.

2000's

Mike Angelo, B04, describes his life in Hawaii: I am currently thoroughly enjoying living and working in beautiful Hawaii. I work for the Hawaii Natural Energy Institute (HNEI), which is part of the University of Hawaii Manoa. A few of HNEI's many areas of research include solar, biomass, H₂ storage and production, and hydrogen fuel cells. I have been working with the hydrogen fuel cells program where we are currently studying the effects that hydrogen fuel impurities such as CO have on the long term steady state performance of hydrogen fuel cells. We are hoping to develop techniques to diminish the negative effect that fuel impurities have on cell performance so that fuel cells can achieve high durability and be used for applications such as powering a home or car. One of the main advantages of this technology is that the only major by-product is H₂O. As an aside, some of the membranes that we test are from Gore and their fabrication plant is right down the road from the University of Delaware in Elkton, MD. I guess there really is no escaping!

In addition to working, I have been enjoying the many outdoor recreational opportunities that Hawaii has to offer. I have been hiking, biking, kayaking, and I have taken up a second job on the weekends working as a dive master at a dive company here in Oahu. I really cannot complain about a place where it is sunny every day and the average daily temperature varies by 7 degrees from winter to summer. I get island fever every once in a while, but then I hop on a plane to another island and go hiking and diving there.

In February **Kimberly Dunham**, B01, became an assistant editor for Chemical & Engineering News, the weekly newsmagazine of the American Chemical Society. She writes:

"The magazine is located at the ACS Headquarters in downtown D.C. ... It is a big career change, but I am really enjoying it. As a member of the production team, I edit articles for grammar and style, and oversee the production of a portion of the magazine each week. They hire people with chemistry and related backgrounds for these positions so that we are familiar with the subject matter and can point out potential technical issues. Most of the people I work with, being that it is ACS, are chemists, many of whom have PhDs; I am actually the only chemical engineer currently on staff! (Keeping the E in CEN she later wrote.)

I finally feel as though I am able to combine knowledge of chemical engineering with some other talents that I have always thought about pursuing writing and editing. I have been learning a lot about all sorts of different areas of chemistry, science government policy, and business, so it has been really exciting! A lot of the people that have started in my position with Chemical & Engineering News have gone on to writing positions, and that's what I'd like to eventually pursue as well. There are some features of the magazine that are open to anyone to write, such as "What's that stuff?", where we explain the chemistry behind everyday things, like gasoline or beer or Cheez Whiz®, and book reviews, so maybe I'll write one of those soon!"

Harvey Johnson, B01, finished his PhD at Berkeley this spring. His thesis title is: "The Organic Solubilization of Viruses and Hemoglobin: Development of New Formulations for Thermally Stable Vaccine Analogues." His thesis advisors were Douglas Clark and Matthew Francis.

Harvey spent three months in Central America (Honduras, El Salvador and Guatemala) before beginning a career in the IT -Derivatives Department at Credit Suisse on October 10th. "I am very excited to apply some of the quantitative skills I learned at Delaware and Berkeley to the world of finance".

Dana Kolesar, B01 wrote: " I graduated from Villanova Law in '04 and worked at Caesar Rivise until March of '06. I am now at Morgan Lewis & Bockius in Philadelphia (directly across the street from my old firm). I am working in patent law, and I think I'm getting very good training here, so things are going well!

Villanova was great. I was able to run on the cross country team for the fall season my first year. Since my NCAA eligibility was up, I joined Bryn Mawr Running Club and started training for marathons. I've run eight marathons now! To be honest, the classes in law school were time consuming, but were no more challenging than chemical engineering.

I also met my fiancé, William Bartow, in law school. We are getting married at Villanova this November. He is a patent attorney as well, and has his mechanical engineering degree from Drexel."

John McCormick, B01, finished his PhD in Materials Science at UD working with Jingguang Chen. His dissertation is titled, "Chemistry of TiO₂ Nanoparticles". John used titanium tetraisopropoxide as the precursor in a flame reactor. He recovered nanoparticles of TiO₂ anatase with a rapid insertion sampler. The particles were driven thermophoretically to the sampler, which remained around 100C despite the high flame temperature.

John's wife, **Roseann DeRito**, UD01, works in Plymouth Meeting and they live in Wayne, PA. John met Roseann in sophomore year.

Brad Taylor, B01, in April wrote: This past December, I defended my PhD entitled "Gas-Phase Epoxidation of Propylene over Au/TS-1 Catalysts" at Purdue University under the advisement of W. Nicholas Delgass (and Jochen Lauterbach). Heterogeneous catalysis has been very fulfilling for me these last several years thanks primarily to the grounding in the field I received by Professors Mark Barteau, Raul Lobo and especially Jingguang Chen. The exposure to characterization and synthesis methods in the laboratory of Professor Doug Buttrey also allowed me to begin my graduate career already experienced in the

myriad of analytical techniques on which my academic and research livelihood depended daily. In fact, it was not until I began graduate school that I truly realized the breadth of information to which I had been exposed at the University of Delaware. While I was always proud of the education I had received, I soon became thankful for the preparation the department provided. I have since left the world of academia for the world of the gainfully employed, having accepted a position at ConocoPhillips Downstream R&D in Bartlesville, OK in the Advanced Hydrocarbon Fuels group within Advanced Technology Development. I may have most recently been a Boilermaker, and now a Phillips 66er, but I will always be a Fighting Blue Hen.

John Heinzel, B02, describes his career since graduation as: After graduation, I took a job at Ion Power in Bear, DE, but was not happy with the job and company direction. I terminated employment there, and went for a master's degree in Chemical Engineering at Rowan University, in Glassboro, NJ. Sony Music USA funded the thesis/research portion of my degree (focusing upon electroplating process improvement for their disc production), so I was "working" there, as my research was done on site, in Pitman, NJ. After graduation with my Master's degree ('04, 3.91 GPA), I took a job as a DoD/DoN civilian chemical engineer, for the Naval Sea Systems Command, at the Philadelphia Naval Business Center (the old Philadelphia Navy Yard), working on energy conversion. Currently I run multiple programs in support of the Office of Naval Research's Advanced Fuel Cell Program. These programs include the development of liquid-phase, desulfurization sorbent for removal of highly refractory sulfur species from Navy logistic fuels, the development of sulfur tolerant and carbon resistant steam reformation catalysts, as well as an integrated fuel cell system modeling and simulation effort using Aspen Plus and Simulink. I also support a variety of equipment development and testing efforts, performed at various locations throughout the country.

I have also decided to begin a part-time PhD effort at Auburn University, due to the work that we have ongoing there, and the close collaboration that we have had through the desulfurization program. I will be performing my dissertation work under the advisement of Dr. Bruce Tatarchuk, studying adsorption of sulfur compounds onto a variety of sorbent materials, and enhancement of sorbent bed performance by using fine powders entrapped in microfibrous meshes to serve as polishing layers with greatly increased mass contact and heterogeneous contacting efficiencies.

On more personal notes, I was engaged this past January to Cari Loveland, of St. Thomas, USVI, and Delaware class of '04. I recently purchased a house in Collingswood, NJ, which is a much more convenient commute than my previous apartment in DE.

Ian Peek, B02, writes: "Shortly after I graduated in May of '02, I began working for Denglas Technologies, a small company that makes optical coatings on glass for display purposes. I was instrumental in developing an organic-based UV-absorbing, abrasion resistant coating. I also helped develop a titanium oxide anti-reflective coating used for sports-field lighting. The low reflection increases the transmission through the glass on each light, requiring fewer light units for the same amount of light on a field. ... I was laid off from Denglas in March 2005, one of 14 layoffs in two weeks.

I worked with Dave Berilla of Career Services and landed a new position with the HydroGlobe Division of Graver Technologies in Glasgow, DE. I am currently working on point-of entry and point-of-use water filters. One of our products is a TiO₂ -based adsorbent which adsorbs heavy metals, specifically lead and arsenic. We also use activated carbon for removal of chlorine, VOC's, and cysts. I find the work very exciting, as the products are responsible for removing contaminants which cause cancer or other illnesses." Ian also is taking courses at UD toward a MChE degree.

This Spring **Pat Reilly**, B02, joined BP in Los Angeles to be on their Refinery Optimization team. Previously he was working for General Chemical in Anacortes, WA. He writes: "Thus far working for BP has been a joy. They are a large player in the global petroleum game, second only to Exxon-Mobil. Due to the current oil market BP has grown to be both the second largest (capitalized assets) and second most profitable company in the world. This makes for exciting times and I feel blessed to be able to take part during such a period of growth.

The Los Angeles Refinery (LAR) was originally built in 1938 by the Richfield Oil Company and had a production capacity of 50,000 bbl/day. Today LAR is a state of the art refinery with an operating footprint of over 700 acres, 1,100+ employees and a capacity of 275,000 bbl/day, making it the second largest refinery in Southern California. Currently LAR makes gasoline, diesel, jet-fuel and anode grade coke from many types of crude slates from around the globe. All products must meet the

California fuels regulations, which are the strictest in the world. LAR supplies roughly 25% of the Los Angeles gasoline market.

LAR is the most profitable business unit within all of BP-Refining/Marketing. This year LAR is on pace to profit in excess of \$1-billion. All of the cash flow ensures that over the next decade there will be a great number of projects to improve upon how we operate at LAR.

The Optimization group is responsible to assess how and what should be done to increase profit margins. Therefore much of my time is spent finding operational bottlenecks and new processes to increase capacity. Once an improvement has been identified it is explored both from a financial and feasibility standpoint.

My first assignment was to examine a naphtha hydrotreater stabilizer for ways to decrease the butane levels in the bottoms product. Gasoline has several product limitations, one of them being the RVP of the gas-pool. Decreasing butane levels allows for an increase of pentanes into the gas-pool at a ratio of 4:1 moles due to the RVP characteristics of butane/pentane gases. This is beneficial because the pentane market is not nearly as strong as the gasoline market, and thus the absorbed pentanes are sold at gasoline prices.

By analyzing the system behavior via Aspen-Hysis and field verification, it was found that adding an optimal liquid draw on the reflux line to the stabilizer decreased the butanes partial pressure within the stabilizer, and thus decreased the butane levels in the bottoms product. Currently the overhead accumulator only has a vapor release and thus the tower is under full reflux.

I've finished my analysis of the both upstream and downstream units and all receiving systems and pumps are fully capable to handle the new flows. I'm now working to design the new control systems, the installation plan/schedule and the standard operating procedures that will be used to operate the unit under the future conditions.

After performing an economic balance over the affected product pools the net gain is approximated at \$1.5-million/year. Installed costs are minimal so I foresee that the project will go to fruition.

At present I have two other projects on my plate including revamping the refinery fuels-recovery system

and correcting a quality issues on the Fluid-Catalytic-Cracker (FCC) clarified-black-oil product."

Pat is also learning to surf. He lives in Rendondo Beach about a block away from the ocean.

The Sunday Life section of the Feb. 5th Sunday News Journal made **Timm Smith's**, B02, job a front page feature. For the last three years Timm has been an associate at W. L. Gore working on new product development. He is a part of a group that conceives, makes, and tests new outdoor clothing. As such Timm makes week long trips to interesting places to use these products. Timm has been to Banff testing hiking togs, ice-climbed at Ouray, CO, skied on Whistler mountain in British Columbia, and visited Scotland, "where it rains from the ground up." Outside magazine featured Timm as one of 13 people with ideal jobs. As an example of product development, Timm considered developing pants that resist ripping when nicked by crampons used in ice climbing. Timm consulted with a polymer chemist to make this fabric. Tim says of himself, "I just love to create stuff. I will sew at home. It's neat to come in every day and see something you just did."

Soujanya Tallapragada, B02, updates herself as follows: I finished my first year MBA at The George Washington University, and am currently interning in the Supply Chain Program at the Raytheon Space and Airborne Systems division in McKinney, TX. It's been a really great thus far, as I was looking for some manufacturing/plant experience. I'm more confident that this really is what I want to do with my career. I go back to DC in September to finish up my second year, and hope to work for a pharmaceutical company as a supply chain manager after I graduate.

Spring semester went pretty well, just the usual time pressure of classes. Oh, I got a scholarship from the Council of Supply Chain Management a few months ago to be used towards next school year, so that was pretty nice.

Some other good news is that I'm getting married next May! His name is Alex, and I met him while I was working at Aberdeen Proving Grounds. He's currently a Captain in the Army, but he's leaving the Army to start his MBA at the Wharton School (U Penn) this fall in finance. We've been engaged for two months, and are trying to plan next year's wedding. It's been fun.

I'm moving to Philadelphia next year after I graduate, so I am focusing my career search in the DE-PA-NJ area. He's American, so my parents took a little getting used to the idea that I was (gasp!) going to marry outside of the culture, but everything is great now, and they love him.

Mara Blicharz, B02, married Mark Warriner on 9/3/05, and now is Mara B. Warriner. **Eileen Paschik**, B02, was a bridesmaid. Mark and Mara bought a house in Yardley, PA. Mara is now a Professional Sales Representative with Johnson & Johnson Consumer Products - AVEENO Brand. She writes: "I really enjoy working for Johnson and Johnson and the Aveeno Brand. Chemical Engineering at UD made product training a breeze! Just for fun, I am pursuing my black belt in Karate and I keep extra busy by studying for my MBA at LaSalle University in Philadelphia."

Katie Whitehead, B02, wrote: "...I am finishing up the fourth year of my PhD work here at UCSB and shouldn't have much more than a year to go. Together with my advisor, Samir Mitragotri, I am working on a very interesting and relevant project involving the oral delivery of proteins (e.g. insulin, heparin, human growth hormone). Specifically, we are conducting a broad study of intestinal permeation enhancers in an attempt to characterize the microscopic chemical properties that yield safe and effective permeation enhancers. We hope to develop a set of 'rules' that will allow investigators to select an appropriate enhancer for their oral delivery system without having to conduct a barrage of safety and potency experiments. The implications for the oral delivery industry, the diabetes community, and patients everywhere could be huge! (This is what gets me to work everyday).

It seems to be the time when lots of people are asking what I will do next...and I really haven't made up my mind. There is a certain appeal to academia, but I'm not sure if I want to do something so time-intensive. Industry could be a good fit, but I am worried about being pigeon-holed in a fixed area and not having much creative leeway. At this point, I'm thinking I'll do a post-doc, maybe at the NIH... we will see. If you have any advice or know anyone who you think would have good advice, please let me know. I figure the more people I talk to, the better.

I am trying to make the most of my time in Santa Barbara while I'm still here- it is one of the most beautiful places I have ever been, it is relaxed, it is peaceful. It is almost always 70 degrees. Coming to school here is one of the

best decisions I have ever made, not only for the excellence the department has to offer, but because this town adds a particular richness to my life. But all good things must come to an end (primarily because I do not have a cool million to buy myself a shack), and I hope to move back to the East Coast to be closer to my family."

Sam Blacker, B03, wrote a complete description of three years of medical school: I am now starting my fourth year of medical school at USUHS (Uniformed Services University of the Health Sciences).

The first year of medical school was pretty rough. The fast pace and intensity was something that took a while for me to get used to. It is the basic sciences year: Anatomy, Biochemistry, Neuroanatomy and Physiology. Physiology was my favorite of those because we were actually allowed to think (something Chemical Engineering more than prepared me to do). The other classes really just involved cramming as much information in my head as I could.

After first year was over, my class (Army, Navy and Air Force) spent a week doing a field exercise similar to the one I did at Army Officer Basic. We lived in tents and did the typical field exercise stuff like land navigation, weapons, repelling, setting up aid stations, basic casualty care, leadership training, and NBC (nuclear, biological and chemical) training, which was really just running around in a bulky suit, with a gas mask, in the mud, in 100 degree weather with an M-16 and other heavy gear while getting smoke grenades thrown at us.

Those in my class without prior military service, like me, were given the opportunity to be with any military unit we wanted. I went to Fort Bragg for experience with the Army Special Forces (Green Berets). The guys I hung out with were training to go to Afghanistan. I got to shoot a lot of weapons, spent two days blowing stuff up with every type of explosive in the Army arsenal, flew in black hawks, did some scuba training with them, spent time on the ground and in the air when they were jumping, I could go on... I learned a lot about how the "real" army works and got a glimpse of how soldiers live, work and use profanity at least two to three times a sentence. Knowing how soldiers think and work will be important when I'm the only doctor in the middle of a desert having to function both as a doctor and a soldier.

The second year of medical school was a lot harder than the first year. Pathology, Microbiology, Immunology,

Pharmacology, and Clinical Skills classes were the major courses. In the second year we learn about every disease and get the background knowledge that will be used throughout our careers.

I got engaged at the end of second year. **Melanie Evans** is a Delaware grad and a medical student at West Virginia University. Our wedding will be in May 2007, after we both graduate.

Once second year ended we had about a month to study and take Step 1 (of 3) of the US Medical Licensing Exam. This was an 8-hour exam that I would rather prefer to forget.

In July 2005, I began my hospital rotations as a third year medical student. Third year students take six week rotations in medical specialties and decide which one they want to do. A third year medical student's job is to collect and report information. I also learned to diagnose and treat patients with the diseases that I had only read about.

My first rotation was surgery. I was at Walter Reed (it's not closing, just moving). At Walter Reed a lot of the patients are casualties from the current Middle Eastern conflicts. It's really satisfying to take part (a small part, really) in their medical care. I'm learning a lot about treating war injuries. I can also say that I am seeing first hand how the injured soldiers are getting top quality care from the time they arrive from overseas until they walk out the doors as healthy people again.

Family medicine was my second rotation. I went back to Fort Bragg for that. Fayetteville, North Carolina would be a fun town if pawn shops, tattoo parlors, Chinese buffets and strip clubs are your thing.

Obstetrics and Gynecology back at Walter Reed made me miserable. I did deliver three babies, but it's not as cool as it sounds. Next I went to Wilford Hall Medical Center in San Antonio for six weeks of inpatient medicine. After that I came back to DC for outpatient internal medicine. Outpatient clinical medicine is hard because I had 20 minutes to identify the patient's problems and effective treatment. A tough rotation that made me really think. I had psychiatry after that at Walter Reed. There was a good mix of the classic psychiatric patients and soldiers affected by deployment. I finished the year with pediatrics. Pediatrics ranges from healthy child check-ups, acutely ill children that we can make better, and the really sick kids

where there is little that can be done. I encountered all three of those many times over. Fortunately, the last was fewer than the others.

I will be taking step 2 of the US medical licensing exam in August. I decided that I want to be an anesthesiologist. I set up my first two fourth year rotations in anesthesia and the rest of the year is filled with requirements (medicine and surgery rotations).

I just got back from our fourth year field exercise. A week-long training exercise designed to train and test our ability to be doctors, officers, and leaders providing medical support in a war environment.

I hope that everything is going as well at Delaware as the web site says it is.

Dan Saffer, M00, PhD03, in October described his "change of address" with: After spending 2 years in Northwest Louisiana working at a Weyerhaeuser's Red River Containerboard mill as their only in-house Process Control Engineer, I have recently accepted a position with Alcoa in their Manufacturing Systems and Technology Division of their Applied Research and Development center located east of Pittsburgh, PA.

My time at Weyerhaeuser allowed me to experience real-world day-to-day operations of a world-class commodities (paper) manufacturing facility. Challenges to these industries include: attempting to remain competitive in an ever-increasing world economy, environmental and energy sustainability and self-sufficiency, as well as a need to both sustain in-place technology while attempting to deliver new and changing technologies securely and seamlessly. I also enjoyed working with many of my former research-group members including Darrin Feather, Jorge Castro, and Philip Wisnewski through inter-mill collaborations.

My position with Alcoa will take me back to my graduate research in cross directional control systems for two-dimensional (sheet, film, foil, etc) products. Our research group assists in delivering key technology improvements to Alcoa's worldwide manufacturing facilities focusing mainly on control, operator interface, diagnostic, sensor, and actuator technologies. Moving to Alcoa also brings my wife Debra and I back closer to both of our families who we missed dearly while living in Louisiana.

Charles Collins-Chase, B04, wrote Fraser Russell: "I wanted to congratulate you on your induction into the

Wall of Fame. I was the Taylor award speaker at that ceremony a few years back, so I know the caliber of people they induct. You're in great company, and I think may even be better qualified than the rest of them! Heck, I think there might've been a chemist inducted the year I was there (the horror).

It turns out that your letter of recommendation all those years back has indeed served me well. I earned a distinction on an MPhil in Engineering for Sustainable Development at the University of Cambridge last year and just finished my first year of law school at the University of Pennsylvania. Things are going well, and I've lined up work with two very cool judges in the Philadelphia/Wilmington area this summer. I'm splitting the summer between Judge Pollak on the Federal District Court for the Eastern District of Pennsylvania and Judge Ambro on the U.S. Court of Appeals for the Third Circuit. I'm interested in getting into international law for patent trade rights on stuff like pharmaceuticals, energy, and pollution control technology."

When asked to comment on the transition from UD to graduate school, **Christine Cardinal**, B05, wrote:

"After graduation from UD last year I moved on to pursue a PhD at the University of Minnesota. My peers, my professors, my advisors here are all astoundingly intelligent. They accepted me as one of their kind before I had a chance to prove myself, and I spent my first year scared that I would not live up to their assumptions.

Here is what I should have realized: a Delaware degree is not granted haphazardly to the undeserving. Nor are the degree standards low. True to its promise, my UD education has served me well during this first year of classes. Every student here has a different academic background, and I am more than happy with mine.

I think what I took for granted, though, is that I was able to get that education while making lifelong friends with my peers. Each morning in my hallway I pass by a photograph of my graduating class. Everyone has signed the mat that frames it. I can honestly say that I love and miss every person pictured there. These are the people who helped me through my lessons, who shaped me into the person I was growing to be, and who ultimately gave me the courage to go to Minnesota. Most of my new classmates had to do many things alone.

I know that I have a long way to go before I finish my advanced degree. What I do know is that I still feel supported in this endeavor by Delaware. I can trust my undergraduate knowledge in its accuracy and its breadth. I can trust my friends to be there for me always. So thank you, to every one of you who touched me those four years. I cannot imagine being here without you."

John Hrycushko, B05, spent last year at DuPont as a contract employee. At the beginning he wrote, "...I work in a nonwovens group working on improving processing of Tyvek and other polymers using Flash Spinning as well as having my hand in a couple other projects. I've been here a month now but I feel like my head is going to explode with everything I have learned. Hopefully this will lead to a full time position at their Richmond facility,..." Lately he writes, "...within a year I went from pilot plant process improvement research to more of a focus on product development with an emphasis on polymer chemistry. I am dealing with polymer solution phase studies, organic chemistry (with regard to polymer/solvent degradation at high temperatures), and even some equipment redesign (with the goal of improving fiber quality through changing equipment geometries)." He also adds that he plays in the DuPont softball league with an undisclosed batting average. In June he learned that his boss took early retirement and the entire flash spinning research program is headed overseas at the end of the year.

Nathan Paul, B05, married Laura Green on April 29th in New Ringgold, PA. Classmates **Amanda Barker**, **Joe Funari** and **Scott Neifert** were on hand to help celebrate. Nathan and Laura now live in Hershey, PA. Nathan is an engineering auditor with the Pennsylvania Public Utilities Commission where he evaluates power plant designs.

C. B. Raval, B05, wrote in June 2006: I have been accepted to the doctoral program in chemical engineering at City College of New York and will be attending in the fall. ...I have given my letter of resignation at my job here at Service Engineering (Aberdeen Proving Grounds, MD) and will be going on vacation to London and India for five weeks before I move into Manhattan. I am very excited about this opportunity because the program provides exposure to bio-tech related research. It is part of the national program called the Integrative Graduate Education Research Traineeship (IGERT).

ARTHUR B. METZNER, 1927-2006



Art Metzner died suddenly on May 4th while attending a meeting in Washington, DC. With his passing it is appropriate to reflect on his contributions as a researcher, teacher, and inspirational leader.

Art was raised in Barrhead, Alberta, a small town at the edge of the prairie located 50 miles northwest of Edmonton and 320 miles due north of the US-Canadian border. The town was quite isolated and the residents strongly bonded together. Career choices for high school graduates were made with considerable input from the community in addition to that of the student and family. Thereby it was determined that Art should study engineering at the University of Alberta, and given the rapid expansion of the chemical industry during WW II, chemical engineering was a natural choice.

Following graduation from Alberta in 1948 Art earned his Sc.D. at MIT in 1951 under the direction of W.K. ("Doc") Lewis. Art had a picture of Lewis in his office, and the scowl on "Doc's" face gave irony to his other nickname, "Loveable". Chemical engineering is serious work.

Art spent two years at Colgate-Palmolive before coming to Delaware in 1953. With his addition the department had six members including **Allan Colburn** and **Robert Pigford**. This group were very active in teaching, authoring textbooks, and research, all with the clear goal of increasing the stature of the department. Art's progress was rapid in this environment, and he became a full professor in 1961 and the *H. Fletcher Brown Professor* in 1963.

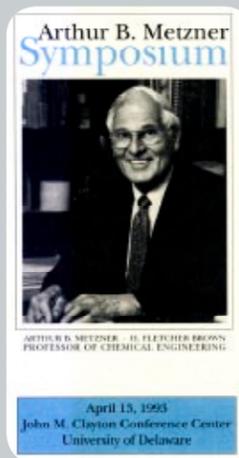
Art was chairman from 1970 to 1978. During this period the department added six faculty, published five books, established the Center for Catalytic Science and Technology (CCST), and had several prominent foreign visitors, including **G.C.A. Schuit**, a leading scientist in catalysis.

Art enjoyed an active consulting practice, and some of his research stemmed from these efforts. **J.R. Anthony Pearson** observed, "[Art Metzner] bothered to find out about real industrial problems, was full of insights into them, and felt that they were the proper starting points for academia in engineering. ...[He believed] academics should look more deeply into them than industrial workers could afford to do."

In a recent interview Art described the impact of this consulting: "Care had to be taken to avoid conflicts of interest, but if this were done, the fundamental problems of these industries provided a rich source of important engineering research ideas for the campus. These research activities centered on rheology, flow, mixing and heat transfer to non-linear fluids – as encountered in processing of polymers, in the handling of slurries, and in turbulent drag reduction. Some of these are now included in engineering handbooks and others have received a pleasing number of citations."

Specific examples of these efforts are the Otto-Metzner correlation for power consumption in the mixing of non-Newtonian fluids, his series of papers on drag reduction with the use of small quantities of viscoelastic fluids, his analysis of the flow of fiber suspension, including a landmark paper on the extensional viscosity of fiber suspensions. He described his research interests as processing of composite materials, polymer processing, fiber spinning and fluid mechanics, but in fact, his work was broader than this. His name is associated with the rheology of non-Newtonian fluids, and as such he was the editor of the *Journal of Rheology*. For these efforts he was given the distinguished service award by the Society of Rheology in 1997.

Art's productivity in research merited awards from the AIChE, ACS, the American Society of Engineering Education and the Society of Rheology. He was a fellow in the AIChE and was elected to the National Academy of Engineering in 1979. Art's eminence as an educator and researcher was recognized on campus with the award in 1981 of the *Francis P. Alison Award*, the University's highest faculty honor. In honor of his 40 years of service and leadership in chemical engineering the *Arthur B. Metzner Symposium* was held in 1993, and the papers from this symposium were published in the October 1994 issue of *IEC Research*. Art Metzner formally retired in 1997 but remained active in the department until his passing. His impact on the department remains strong.



Art developed a very special teaching technique. His courses were divided into a set of topics. Art would assign reading for each topic and then give a few lectures in which the core of this material was explained clearly, as in chapter summaries. The students were also assigned a set of comprehensive problems which often required more knowledge than covered in the lectures. The solutions to selected problems of the set were then given with a ratio of two units of problems for each unit of lecture. The students worked diligently to complete these problem sets, for Art called on the students to explain their approach. Woe be unto the student who was not prepared. Art wanted the students to gain confidence that they could get the knowledge needed to solve a specific problem on their own. This approach made them more attentive readers of the textbook and more confident of their engineering skills.

His approach to the graduate fluid mechanics course also was unique. The first class was usually on a Thursday, and Art would assign the first three chapters of *McConnell's* book on tensor calculus for the following Tuesday. Even a moderate study of this material would spoil the weekend. However, this set the stage to cover the entire book in three weeks and thereby elevate the rigor of the remainder of the course.

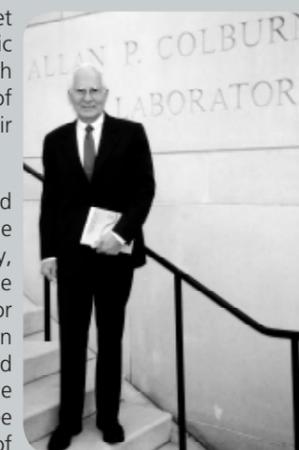
In the late nineties the oil production of Prudhoe Bay dropped by half, and the Alyeska Pipeline Service company hired Art as a consultant to review their operations. Art gathered a group of experts who ultimately made strategic reductions in the number of pumping stations and made use of drag reduction insights. Art brought this accumulated knowledge to the undergraduates as a design problem in the first chemical engineering laboratory course. The students found that the operation of a pipeline is much more complex than the operation of the pipe rack in the laboratory. Their problem was to specify the location of pumping stations from Prudhoe Bay to Valdez. Successful solution of the problem required digestion of a large quantity of literature, understanding of fluid flow in a partially filled pipe operating with major changes in elevation, and consultation with the master, Art Metzner. This is an example of "problem based learning" at its best.

Art had great success as a mentor, a warm colleague and a friend. The most obvious role for a mentor is as a research advisor: Art directed 48 bachelor theses, 46 masters, and 38 PhDs. At the beginning of the project, the mentoring was one way, but as the work progressed, Art encouraged (perhaps demanded) independent thought and insight. Art kept track of these students after they graduated, and he was a gifted and conscientious letter writer. When promotions came Art's congratulatory notes were incisive and instructive; the recipients felt truly honored.

Art Metzner was a skilled and subtle leader. In a university leadership mostly is to note the strengths of the subordinate and to make suggestions for improved results. However, Art could be political when needed; he found bloodless ways of getting rid of those he judged hopeless. The correctly written letter of recommendation helped transfer an underachieving student to another institution, or a fatherly talk about career choices would help another move on. When a problem arose that needed to go up the chain of command, Art would write a polite letter describing the issue, offer several possible solutions, and then gently suggest the one thought to be best. This approach worked because Art enjoyed great respect from all, and his recommendations were voiced to be for the good of the institution.

Art also served on the 1984 government panel that made recommendations in "*Report on High Performance Polymer Composites*". He was on the advisory boards for chemical engineering at Princeton, McGill and MIT, and on the advisory council for the school of engineering at Penn State. He also was a member of the board of directors of the Chemical Heritage Foundation. He brought his incisive analytical thought processes to these meritorious service activities.

Art Metzner had an illustrious career, and his efforts contributed greatly to the success of this department. At the beginning of May he was his usual interesting self in a lunch time discussion, and then he was gone. His strength of personality is still very much with us.



Mark A. Barteau, Robert L. Pigford Chair and Department Chairperson, has been elected to the prestigious National Academy of Engineering (NAE). Mark is noted for his distinguished work in advancing the fundamental understanding of surface chemical-reaction mechanisms and for the design and invention of new



Academy membership is among the highest professional distinctions accorded to an engineer, honoring those who have made outstanding contributions to engineering research, practice or education. It recognizes scientists who have been pioneers in new and developing fields of technology, made major advancements in traditional fields of engineering or developed innovative approaches to engineering education. Mark is a leader in applying surface science and computational chemistry techniques to understanding surface reaction mechanisms and using these to design new catalysts. His most recent work has produced a new bimetallic catalyst for direct epoxidation of ethylene. He proposed that a never-before-seen surface oxametallacycle was the missing link in olefin epoxidation. Combining experiment and theory, his research group synthesized and identified an oxametallacycle on a metal surface. Mark's group further demonstrated that competing reactions of the oxametallacycle controlled epoxide selectivity, and from this predicted computationally and demonstrated experimentally that a copper-silver bimetallic catalyst is superior to pure silver. Mark was one of the first to apply surface science techniques to understand the site requirements for reactions on metal oxides. One application has been

his invention of a new catalytic process for the synthesis of ketenes.

Mark Barteau is the principal investigator for a \$1.6 million award from The U.S. Department of Energy. This award is for three years to fund a research project to refine the design of catalysts while also developing new technologies that could lead to the development of alternative fuels, the improvement of fuel cells and a decrease in pollutants. This project also includes **Douglas J. Buttrey**, **Jingguang G. Chen**, **Jochen A. Lauterbach**, **Raul F. Lobo** and **Dionisios G. Vlachos**, University of Delaware professors of Chemical Engineering, James A. Dumesic and Manos Mavrikakis, University of Wisconsin and Richard M. Crooks, University of Texas.

Thomas H. Epps, III, a new faculty member as of June 2006, and an ACS Scholar, attended their reunion at the ACS National Meeting in San Diego in March. The scholarship and mentoring program is designed to encourage African American, Hispanic/Latino, and Native American students to pursue undergraduate degrees in the chemical sciences. It was Thomas's father, a retired chair of chemistry and physics at Virginia State University, who saw a flyer about the ACS Scholars Program and encouraged Thomas to apply when he was a freshman at MIT in 1995. Thomas now says the program is paying dividends for him even today. Being located near the ACS headquarters, he has been able to attend advisory meetings which still give him the opportunity to network with other people.



Eric W. Kaler, Dean of the College of Engineering and Elizabeth Inez Kelley Professor of Chemical Engineering, was honored with this year's E. Arthur Trabant Institutional Award for Women's Equity. Eric was recognized for his ongoing efforts to increase the number of female faculty members in the College of Engineering, for his initiation of the University's Women in Engineering (WIE) program and for establishing a satellite (Undergraduate) mentoring program.

Co-investigators **Eric Kaler**, Dean & Elizabeth Inez Kelley Professor of Chemical Engineering, **Eric Furst**, Assistant Professor of Chemical Engineering, and **Norm Wagner**, Alvin B. and Julia O. Stiles Professor of Chemical Engineering, as well as, **Orlin Velev**, Assistant Professor of Chemical and Biomolecular Engineering at NC State, and **John Brady**, Chevron Professor of Chemical Engineering at Cal Tech have received a \$1.3 million grant from the National Science Foundation to fund research on nanoscale directed self-assembly in electrical and optical fields. The team will be laying the groundwork for new technologies by directing tiny particles invisible to the human eye to create materials such as crystal arrays and wire-like structures that can then be used to create even more complex materials. This team will be looking at new ways to take nanoscale "building blocks" and assemble them into highly structured, highly functional materials.

Abraham M. Lenhoff, Gore Professor of Chemical Engineering, is the principal investigator of a five-year, \$10.4 million grant awarded by The National Institutes of Health (NIH) to study membrane protein production and characterization, a field that is of growing importance in biomolecular research. Also participating in the project are **Eric Kaler**, Elizabeth Inez Kelley Professor of Chemical Engineering and dean of the College of Engineering;

Anne Skaja Robinson, Associate Professor of Chemical Engineering; **Millicent M. Ow Sullivan**, Assistant Professor of Chemical Engineering; **Brian J. Bahnson**, Associate Professor of Chemistry and Biochemistry; **Patricia DeLeon**, Professor of Biological Sciences; **Ulhas Naik**, Associate Professor of Biological Sciences; **Jung-Youn Lee**, Assistant Professor of plant molecular biology; and **Yu-Sung Wu**, Research Fellow at the Delaware Biotechnology Institute (DBI). This interdisciplinary grant was awarded through the NIH Center for Biomedical Research Excellence (COBRE) program and will fund research motivated by the disparity between the critical role of membrane proteins in biology and the well-recognized deficiencies in production and structural characterization of these molecules.

Congratulations to **Jochen Lauterbach** and **Raul Lobo** on being promoted to full professors, effective September 1, 2006.

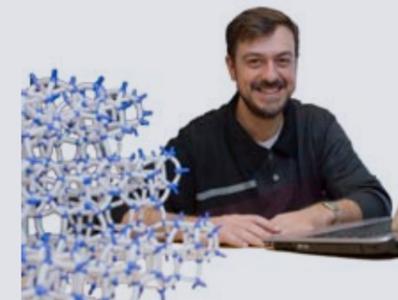
Christopher Roberts was selected as the recipient of the 2005 New Investigator Grant in Pharmaceuticals and Pharmaceutical Technology sponsored by Pfizer Global Research & Development. This \$25,000 award was presented at the 2005 AAPS Annual Meeting.



T.W. Fraser Russell, Allan P. Colburn Professor and '64 PhD EG, was inducted into the Alumni Wall of Fame on May 5, 2006. This award honors members of the alumni associated from around the world who have distinguished themselves in professional and community endeavors. Dr. Russell served as Vice Provost for Research and significantly increased the sponsored research funding and was instrumental in establishing a summer undergraduate research program. He served as Director of the Institute of Energy Conservation from 1979-1996 and was Chair of the department from 1986-1991. He has received four patents for his work and has three pending.

T.W. Fraser Russell was recently presented an Engineering Excellence Award by the DuPont Co. This honor has traditionally been reserved for DuPont engineers and scientists for outstanding technical contributions, however, Russell was honored for his "guidance and technical leadership" as a consultant to the company's Engineering Service Division from 1968-98. The award was formally presented on October 24, 2005 during a special session in which Fraser outlined for the DuPont Engineering Division his 30 years of consulting. Fraser spent about one day a week throughout the course of those three decades working with the heat, mass and momentum transfer group in the engineering division at the former DuPont facility at Louviers, just outside Newark. The work provided valuable insights that he could share with students citing the impact on the teaching of analysis. "Engineers in industry have time constraints and uncertainties not found in academia," he said. "Incorporating that concept made the teaching much more effective and the research completed on campus had more immediate and pragmatic value."

Dionisios Vlachos, Professor, is leading a research team using mathematical models to study the growth of certain types of cancer, including breast and prostate cancer, with an eventual goal of developing new drugs. The researchers have been awarded a three-year grant of nearly \$1.2 million from the U.S. Department of Energy to undertake the project, which could provide a key to understanding and eventually controlling these cancers. The research involves multiscale modeling of protein interactions that result in interesting phenomena, such as receptor clustering.



The team includes **Jeremy Edwards**, former UD Assistant Professor who now is a member of the molecular genetics and microbiology faculty at the University of New Mexico Health Sciences Center; **Markos Katsoulakis**, Professor of Mathematics at the University of Massachusetts; and **James Faeder** of the Theoretical Biology and Biophysics Group at Los Alamos National Laboratory. Dion stated the project will target hormone-responsive forms of cancer, such as breast, ovarian, endometrial and prostate cancer. Through the use of biomathematical models, the researchers hope to develop tools to understand the process and turn that knowledge into the development of new drugs that can hold the cancers in check.

Norman Wagner, a University of Delaware researcher who has attracted international attention for his work with the Army Research Laboratory on a liquid body armor project, has been named the Alvin B. and Julia O. Stiles Professor of Chemical Engineering. Norm said he is "ecstatic" about the appointment, particularly given that as a new member of the faculty 14 years ago he knew Prof. Stiles, the late UD chemical engineering professor and benefactor for whom the professorship is named. Norm, who has been a member of the UD faculty for 14 years, is working in several key areas of research, including shear thickening fluid that is best known for its use as liquid body armor. Also, he is studying pancreatic cancer in cooperation with researchers at Thomas Jefferson University Hospital, molecular transport in plants, directed self-assembly and rheology. Norm is studying the molecular structure of cells, and specifically, the modeling of the transport of pharmaceuticals through the human body, in cooperation with researchers at Thomas Jefferson University Hospital. He is developing molecular simulations to engineer polymers for potential pancreatic cancer therapy, applying the principles of chemical engineering to the human body. In addition, Norm is working to understand transport in plant cells to better understand how plants grow and how they respond to drought, as part of a National Science Foundation Nanotechnology and Interdisciplinary Research Initiative (NIRT) team studying directed self-assembly of nano-scale structures and is heavily involved in rheology, the science of how things flow, and efforts to develop an international-class laboratory on the UD campus.

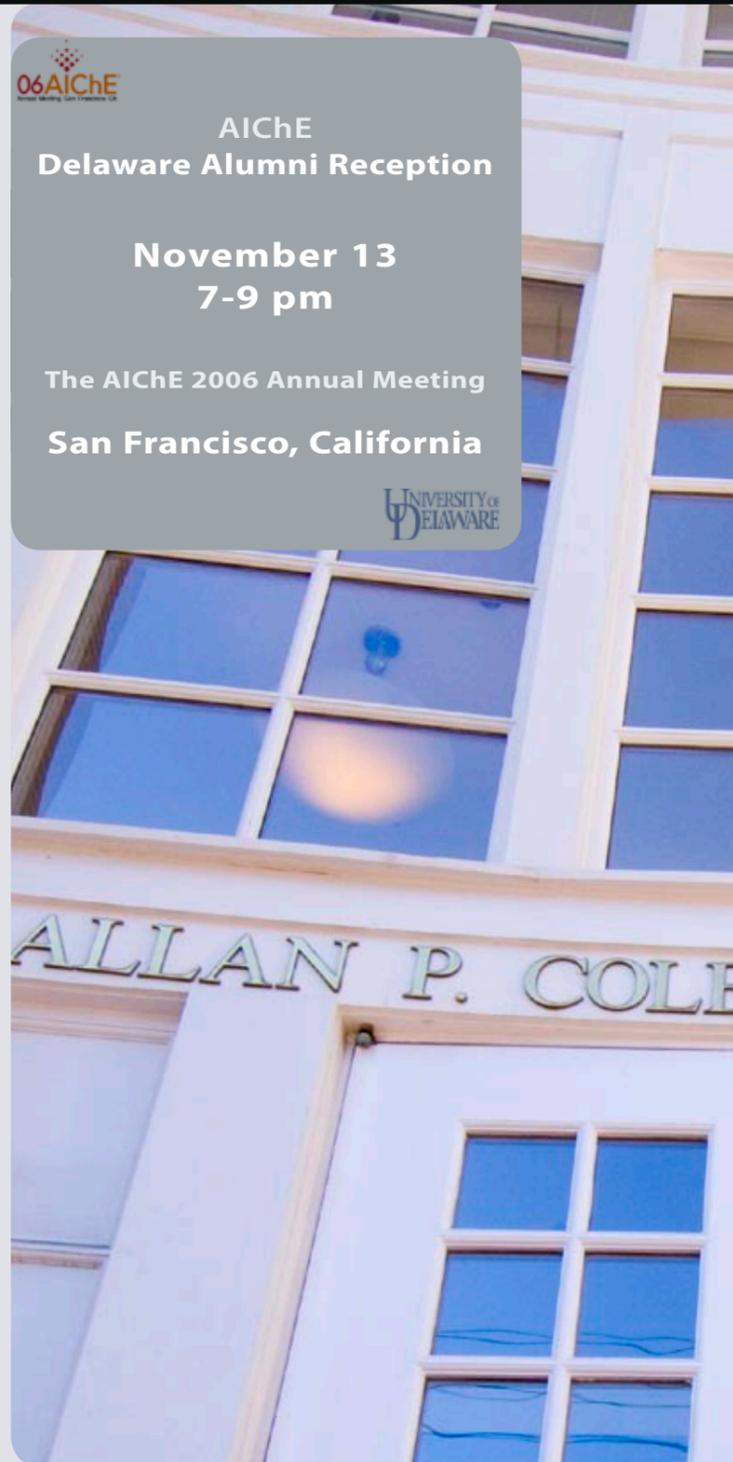
Norman Wagner was noted in a story on liquid body armor in the May issue of *Scientific American*. This material also received mention in the April 21 *Baltimore Examiner*. Please see "Department News" for a list of additional articles on Norm and liquid body armor.



Norman was also a guest on *Radio America's G. Gordon Liddy Show* on June 21 to discuss his research on liquid body armor. The research was featured June 15 by the *ScienCentral* news agency and on the ABC television network.

Norm and his research on liquid body armor were also featured on the 11 o'clock news, *NBC* channel 10 out of Philadelphia on September 7, 2005.

Norm was interviewed by Renee Montagne for *National Public Radio's Morning Edition* on August 29, 2005 about his research on liquid body armor.



The University of Delaware graduate program in chemical engineering remains among the nation's elite, according to rankings to be published in the forthcoming 2007 U.S. News & World Report newsstand book "America's Best Graduate Schools." The chemical engineering graduate program is ranked ninth in the nation, tied with the University of California Santa Barbara. The Massachusetts Institute of Technology program was as the top of the list, followed by the California Institute of Technology, the University of California Berkeley, the University of Minnesota, the University of Wisconsin, Stanford University, Princeton University, the University of Texas, UD and UC Santa Barbara.

According to a recent report in Chemical and Engineering News, **UD's Department of Chemical Engineering was ranked ninth nationally** in total spending on chemical engineering research and development, at \$8.3 million, and sixth in federal support, at nearly \$6.2 million, based on total expenditures and federal support for research and development for the year 2003.

UD was ranked third in the top 10 chemical engineering producers in the doctoral degree category with 18 doctoral graduates in chemical engineering in programs approved by the American Institute of Chemical Engineers and the Accreditation Board for Engineering & Technology as reported in the September 2005 issue of Chemical and Engineering News.

Robert W. Gore, Chairman, Board of Directors, W. L. Gore & Associates, and an Advisory Board Member of the Chemical Engineering Department, is a 2006 inductee to the National Inventors Hall of Fame. He invented a new form of polytetrafluorethylene (PTFE), known as GORE-TEX®. This is a highly porous, very strong material that is chemically inert and functions within a wide range of temperatures and is weatherproof. This material is valued for its durability, wind-resistance, being waterproof and breathable. GORE-TEX® materials are found in hundreds of medical, industrial, electrical and textile products.

UD's Department of Chemical Engineering sponsored a "Sustainable Energy and Chemical Engineering" symposium on Thursday, Jan. 26, at Clayton Hall on the Laird Campus. The symposium's objective was to increase awareness of chemical engineering's contributions to energy-related issues and consider the future of research. The symposium was open to the public.

Department of the Month

The DOHS is pleased to recognize the Department of Chemical Engineering as the December 2005 Department of the Month. The Chemical Engineering Safety Committee is chaired by **George Whitmyre**.

The November 2005 Safety BeakOn contained an article about the delays encountered in the renovation of the Brown Laboratory due to the high amounts of mercury found in many of the laboratories there. **George Whitmyre** discussed this article at the November Safety Committee meeting and suggested that the department hold a building wide drive to replace their mercury thermometers and manometers with non-mercury containing units. The committee agreed with the proposal and the project was agreed to by the CE Department. This project will reduce the possibility of mercury contamination in the building.

Collection bins will be located in several labs throughout Colburn Lab. A double lined drum was donated by DOHS for the consolidation of the collected items. When the collection ends, the materials will be disposed of through the DOHS chemical waste program.

Thanks to **Dr. Barteau** for funding the replacement devices and the Chemical Engineering Department for their participation in the project as well as their commitment to environmental health and safety.

A special thanks to the Safety Committee members:

- Kim Correll
- Dave Cowgill
- Justin Federici
- Trudy Riley
- Chris Robinson
- George Whitmyre

The University of Delaware Technology Corp. (UDTC) has selected Armor Holdings Inc., a leading manufacturer of security products and vehicle armor systems, as an exclusive licensee for liquid body armor, the unique shear thickening fluid technology developed by **Norman Wagner**, Alvin B. and Julia O. Stiles Professor of Chemical Engineering, and Eric Wetzel of the U.S. Army Research Laboratory's Weapons and Materials Research Directorate and a UD alumnus. Armor Holdings, which will be the sole commercial provider of this technology in applications related to body armor vests and extremity protection, helmets and gloves for protective use worldwide, anticipates fielding the first products later this year. Armor Holdings has selected Barrday Inc. as a partner for development and production of shear thickening fluid-based ballistic fabrics because the organization has strong complimentary experience in weaving fabrics from high strength fibers as well as applying films, resins, finishes and coatings for both soft and hard armor applications.



Additional articles regarding the thickening liquid that strengthens body armor developed by **Norman Wagner** and Army scientist Eric Wetzel, which was reported to you in last year's Alumni Newsletter, has also been written about in 2005/2006 in the following articles:

UD Science Helps Protect Troops, by Michele Besso in *The News Journal* newspaper, Wilmington, DE on October 24, 2005.

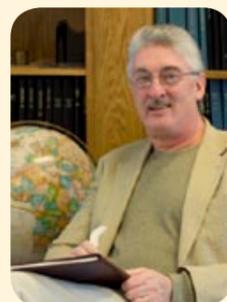
U of D Develops New Body Armor in *The Cecil Whig* newspaper, Elkton, MD on February 28, 2006.

UD Research Soon May Aid U.S. Soldiers, by Gary Haber in *The News Journal* newspaper, Wilmington, DE on March 23, 2006.



Norman Wagner received the American Chemical Society Delaware Section Award. This award recognizes conspicuous scientific achievement in an area of chemistry or chemical engineering by a Delaware Section member. His abstract titled "*STF Armor: Nanoparticle Composites for Flexible Materials & the Rheology of Colloidal & Nanoparticle Dispersions*" was presented at a dinner on January 30, 2006.

Richard Wool, Professor of Chemical Engineering, and doctoral student **Lin Zhu**, were featured in an October 3 *Chemical & Engineering News* story concerning advances in green polymers.



GRAD STUDENT AWARDS

The 2005 Perkin Medalist, Dr. Robert W. Gore, selected **Ron Egres** to receive the Sixth Annual Perkin Scholarship. This \$5,000 stipend from The Society of Chemical Industry – America Section, was presented in Dr. Gore's name at the Perkin Medal Award Dinner held in Philadelphia in September, 2005.

Joseph Fedeyko won the poster award at the 7th Netherlands Catalysis and Chemistry Conference on March 8, 2006. This was one of two awards given for over 100 posters.

Carl Menning received the Garrett Reed Cantwell Graduate Scholarship at Honors Day, May 5, 2006.

Ashish Mhadeshwar received the 2006 Allan P. Colburn Prize, awarded by the University of Delaware for the outstanding dissertation in Mathematical Sciences and Engineering. Ashish's research was carried out with **Dion Vlachos**.

Jennifer O'Donnell received the Fraser and Shirley Russell Teaching Fellow Chemical Engineering award presented at Honors Day held May 5, 2006.

Michelle O'Malley was selected as a 2006 fellow in the NASA-Harriett G. Jenkins Pre-doctoral Fellowship Program (JPPF).

Armin Opitz received a Robert L. Pigford Teaching Assistant Award presented at Honors Day held May 5, 2006.

Michelle Spatara received a Robert L. Pigford Teaching Assistant Award presented at Honors Day held May 5, 2006.

On February 14, UD held its first comprehensive conference, UD Computational Science Day 2006, to unite those who use computing power in their campus research. The first-place winner of the scientific poster contest were grad student **Luo Wang** and **Antony N. Beris**, Arthur B. Metzner Professor of Chemical Engineering, for "*Direct Numerical Simulations of Turbulent Flow in a Wavy Channel.*"

Luo also received a Robert L. Pigford Teaching Assistant Award presented at Honors Day held May 5, 2006.

Seth Washburn was awarded The Joyce and Robert Richards Endowed Fellowship. This \$4,000 fellowship was started by the Richards family to support a married graduate student in the College of Engineering.

Erik Welf received a Robert L. Pigford Teaching Assistant Award presented at Honors Day held May 5, 2006.

Mingjiang Zhan, studying with **Richard Wool**, developed a circuit board made from soybeans and chicken feathers that was on display at the Science Museum in London as part of a free exhibition featuring innovative new mobile phone technology. The printed circuit board is part of a collaborative effort with Intel Corp., and the research is funded by a U.S. Department of Agriculture National Research Initiative grant.

STUDENTSTATS: 2005-06

219 undergraduates enrolled

52 BChE graduates

11 to graduate & professional schooling

UNDERGRAD STUDENT AWARDS

Marcus Adams received the Chemical Engineering Class of 1953 Scholarship at Honors Day, May 5, 2006. Marcus also received the Merck Outstanding First-Year Chemical Engineering Student Award.

Natasha Adnan received an Amerada Hess Corporation Award at Honors Day, May 5, 2006.

Anna Barnette received a Chemical Engineering Alumni Laboratory Award at Honors Day, May 5, 2006.

Jason Binz received a Mr. and Mrs. James F. Kearns Scholarship in Chemical Engineering at Honors Day, May 5, 2006.

Aaron Chockla received a Chemical Engineering Class of 1950 Scholarship at Honors Day, May 5, 2006.

Matt Decker received a Chemical Engineering Industrial Sponsors Undergraduate Research Award at Honors Day, May 5, 2006.

Michael Dignan received a Chemical Engineering Industrial Sponsors Scholarship Award at Honors Day, May 5, 2006.

Ankur Doshi received a Mr. and Mrs. James F. Kearns Scholarship in Chemical Engineering at Honors Day, May 5, 2006.

Nikki Ennis received an Amerada Hess Corporation Award at Honors Day, May 5, 2006. Nikki also received the Stanley Jacob Schechter Award.

Becky E. Gable received the University of Delaware Chapter of Sigma Xi 2006 University Thesis Award for *"Surface Chemistry Dependence on Microheological Measurements"*. Her advisor is **Eric Furst**.

Becky E. Gable was awarded a \$250 research grant in Fall 2005 for "Surface Chemistry Dependence on Microrheological Measurements". Becky also received a Chemical Engineering Alumni Laboratory Award at Honors Day, May 5, 2006.

Kristie Grammatikos received the Schipper Undergraduate Chemical Engineering Scholarship presented at Honors Day held May 5, 2006.

Joseph Houghton received the Center for Composite Materials Undergraduate Research Award at Honors Day, May 5, 2006. **Joseph** also received a National Starch and Chemical Company Undergraduate Scholarship.

Aven Hyatt received a Chemical Engineering Alumni Laboratory Award at Honors Day, May 5, 2006.

Jisha John received the Sylvia and Charles Joanedis Chemical Engineering Scholarship at Honors Day, May 5, 2006.

Gerald Klinzing received the John Allan Thoroughgood Legacy Scholarship in Chemical Engineering award presented at Honors Day held May 5, 2006.

Andrew Korinda received a Chemical Engineering Class of 1950 Scholarship at Honors Day, May 5, 2006.

Johan McConnell received a National Starch and Chemical Company Undergraduate Scholarship at Honors Day, May 5, 2006.

Zach Mellinger received a Chemical Engineering Class of 1952 Scholarship at Honors Day, May 5, 2006.

Michael Moritz received a Robert L. Pigford Undergraduate Award presented at Honors Day held May 5, 2006.

Robert Nehring received the Walter Silowka Chemical Engineering Scholarship Fund award presented at Honors Day held May 5, 2006.

Elizabeth Oeffinger received a Chemical Engineering Industrial Sponsors Undergraduate Research Award at Honors Day, May 5, 2006.

Geoffrey Oxberry received a Tau Beta Pi Fellowship for the 2006-2007 year. Geoff also received the American Institute of Chemical Engineers Senior Award at Honors Day, May 5, 2006.

Gina Palladino received the Steven R. and Linda Justice Myrick Award at Honors Day, May 5, 2006.

Andrew Peiffer received a George Fish Scholarship at Honors Day, May 5, 2006.

Justin Quon received the American Institute of Chemical Engineers Junior Award at Honors Day, May 5, 2006. Justin also received a Merck Engineering and Technology Scholar award and the Donald F. Othmer Sophomore Academic Excellence Award.

Matthew Rosborough received an Amerada Hess Corporation Award at Honors Day, May 5, 2006. Matt also received a Chemical Engineering Class of 1952 Scholarship at Honors Day, May 5, 2006.

Daniel Roth received a George Fish Scholarship at Honors Day, May 5, 2006. Dan also received a Merck Engineering and Technology Scholar award.

Tommy Scherr was one of five University of Delaware scholar-athletes presented with the Miles Powell Jr. Scholarship for outstanding achievement on the playing field and in the classroom. The scholarships honor UD scholar-athletes who excel in engineering. Scherr helped lead the UD men's lacrosse squad to a record of 12-5 and a berth in the Colonial Athletic Association championship game. Tommy started all 17 games in goal this season and played all but 65 minutes. He allowed 136 goals for an 8.55 goals against average and posted 180 saves for a .570 save percentage. He ranked third in the CAA and among the top 25 nationally in both categories.

Craig Schneider received an Amerada Hess Corporation Award at Honors Day, May 5, 2006. Craig also received a Chemical Engineering Class of 1950 Scholarship and a Robert L. Pigford Teaching Assistant Award presented at Honors Day held May 5, 2006.

Josh Selekmán received a George Fish Scholarship at Honors Day, May 5, 2006.

Justin Spaeth received the Chemical Engineering Industrial Sponsors Senior Student Award at Honors Day, May 5, 2006.

Brian Walck received the American Institute of Chemical Engineers Sophomore Award at Honors Day, May 5, 2006. Brian also received a National Starch and Chemical Company Undergraduate Scholarship.

Peter Welfel received a Robert L. Pigford Teaching Assistant Award presented at Honors Day held May 5, 2006.

Aaron Williams received a Robert L. Pigford Teaching Assistant Award presented at Honors Day held May 5, 2006.

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Khalid Al-Majnouni
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Russell Burnett
Brigham Young University

Stuart Collins
University of Colorado, Boulder

Elizabeth D'Addio
Villanova University

Daniel Esposito
Lehigh University

Danielle Hansgen
University of Washington

Kate Hollabaugh
Carnegie Mellon University

Nathan Hould
SUNY at Stonybrook

Irene Hsu
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Bogazici University Turkey

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Virginia Polytech Institute & State University

Mary Vukmir
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David Winski
Purdue University

Hua Min Yang
New Jersey Institute of Technology



February 2006

Dr. Huimin Zhao

University of Illinois

*"Biomolecular Engineering for Fun and Profit"***Dr. E. Terry Papoutsakis**

Northwestern University

"Complex Phenotypes in the Era of Genomics"

March 2006

Dr. Daan Frenkel
(Wohl Lecture)

Institute for Atomic and Molecular Physics

*"Ostwald, Gibbs and Crystal Nucleation"***Dr. Rachel Chen**

Georgia Institute of Technology

*"Molecular Engineering Approaches to Permeability Issues in Whole-Cell Biocatalysis"***Dr. Xinqiao Jia**

University of Delaware

*"From Silicon Oxide Nanodots to Artificial Vocal Folds: Advanced Materials by Design"***Dr. Christine E. Schmidt**

University of Texas at Austin

"Engineering Strategies for Functional Nerve Repair"

April 2006

Dr. Richard M. Felder

North Carolina State University

*"Engineering Education in 2015 (Or Sooner)"***Dr. Jacqueline V. Shanks**

Iowa State University

*"Phytochemical Engineering – Combining Chemical Reaction Engineering with Plant Science"***Dr. John R. Dorgan**

Colorado School of Mines

"Dynamic Monte Carlo Simulation of Polymer Melt Rheology"

May 2006

Dr. Patrick S. Doyle
(Colburn Lecture)

Massachusetts Institute of Technology

"Dynamics of Complex Fluids in Microfluidic Devices"

September 8, 2006

Dr. Lee Lynd

Dartmouth College

"Consolidated Bioprocessing for Low-Cost Processing of Lignocellulosic Biomass: Potential, Progress, and Paradigms"

September 29, 2006

Dr. James Dumesic

University of Wisconsin-Madison

"Catalytic Production of Fuels from Biomass-derived Oxygenated Hydrocarbons"

October 6, 2006

Dr. William Banholzer
The Pigford Memorial Lecture

Dow Chemical Company

"Personal Experience in the Application of Chemical Engineering and Selected Research Topics at Dow"

October 20, 2006

Dr. Mauricio Futran & Dr. San Kiang

Bristol-Myers Squibb

"Emergence of Modeling in Pharmaceutical Process Development"

November 3, 2006

Dr. Kyle Vanderlick

Princeton University

"Marring, Merging, and Manipulating Lipid Membranes"

December 1, 2006

Dr. Kristen Fichtorn

Pennsylvania State University

"Atomic-Scale Simulations in the Nanoscience of Interfaces"

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The Department of Chemical Engineering gratefully acknowledges the generosity of its Alumni and Friends. We have made every effort to include the names of those who have contributed. If we have omitted anyone, our apologies. Please let us know at: alumni-news@che.udel.edu so that we may correct the error. (Gifts received from July 1, 2005 through June 30, 2006.)

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ChE launches a new web design.

We're excited to announce our new look. The new site 'rolled-out' on July 19, 2006.

In addition to a fresh new look, we have added some additional functionality including a Google Search box that allows users to search from any page. We have also added PHP programming that draws information from our

internal database to display the faculty pages and other 'people' data. Thanks to the efforts of Randolph Oswald, our CITA III and Carrie Qualls, our Coordinator. These two collectively implemented the recommendations of the WEB/PR committee and put them into place for the new design and functionality.

Some of the new pages include Frequently Asked Questions (FAQs) pages for Grad and Undergrad students. These pages will aid in the students getting acquainted with the department and university procedures.

We are always open to feedback and new ideas about our site. Feel free to drop us an e-mail at webstaff@che.udel.edu with your thoughts.



A special thanks to the WEB/PR Committee:

Sharon Anderson, Mark Barteau, Sheila Boulden, Eric Furst, Jochen Lauterbach, Raul Lobo, Trudy Riley and Carrie Qualls.

Please fill out this form and return it to update the Department's records. If you have events happen during the year, please share them with us to be included in the newsletter: alumni-news@che.udel.edu

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Would you like your name added to the Department Seminar mailing list? Yes No
(there is no charge for alumni to attend seminars presented by distinguished leaders in the Chemical Engineering profession.)

Please use the other side of this form to give additional information about yourself, your career and family. Do you have any questions or requests? Please let us know and return this form to:

We'd like to ask you to join your fellow UD Graduates and Friends and help support our Department:

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WHAT'S NEW WITH YOU? >>

Please use this page to update the Department's records. If you have events happen during the year, please share them with us to be included in the next issue of the newsletter: alumni-news@che.udel.edu

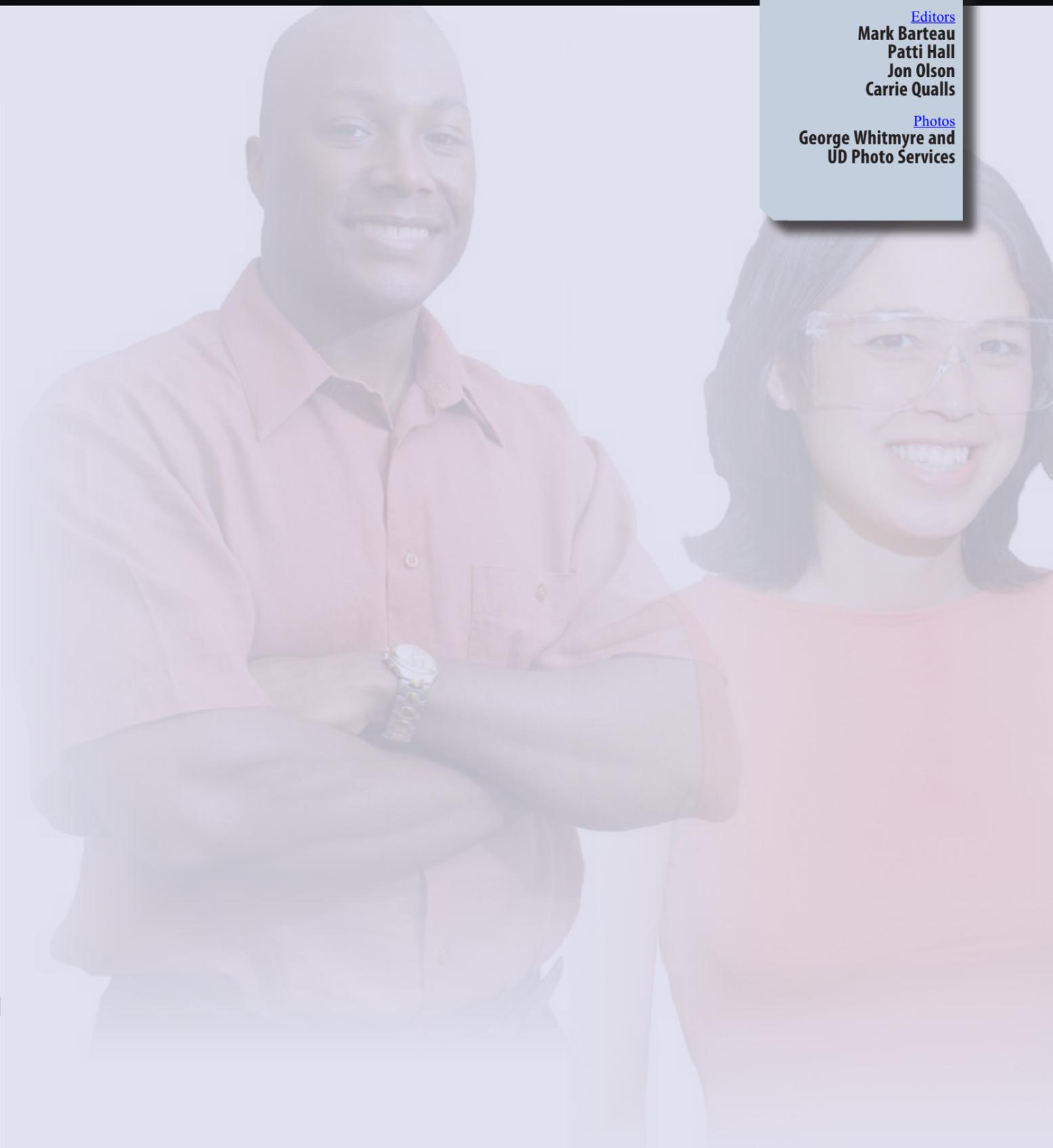
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