

Chemical Engineering

# Alumni News

## The Path to Prominence

Delaware First **Partnership** Engagement **Impact** 

### DELAWARE Alumni Reception



#### Monday, November 17, 2008

7-10 p.m. Carpenters' Hall 320 Chestnut Street Philadelphia, PA

www.aiche.org/annual

## 2007-08

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### LETTER FROM THE CHAIRMAN



Norman Wagner

elcome to the 2008 Alumni Newsletter! As I noted last year, "a lot can happen in a year" - what an understatement! The first year with our new President, Dr. Patrick (Pat) Harker can best be described as astonishing. The overriding theme on campus has been the development and

announcement, at the first UD Forum on May 10<sup>th</sup>, of the new strategic plan – "Path to Prominence<sup>™</sup>" –a brief synopsis of which you will find on the inside back cover (more details at www.udel.edu).

"Change" best describes the atmosphere on campus, and in the past year we have seen the replacement of nearly the entire upper administration as well as many leadership roles around campus, and within the Department and College. Eric Kaler, former Dean of the College and valued colleague, accepted the position of provost at Stony Brook. He has been replaced by Michael Chajes, former chair of Civil Engineering at UD and interim Dean. Mark Barteau (Robert L. Pigford Chair and director of the UD Energy Institute), who played a central role in organizing and leading the development of the UD Strategic Plan, has been promoted to Senior Vice Provost for Research and Strategic Initiatives as of July 1<sup>st</sup>. This past January, **Dion** Vlachos started as CCST center director and Eric Furst as CMET center director. Further, as I am writing this letter, Kelvin Lee (Gore Professor and DBI Fellow) has been announced as the new director of the Delaware Biotechnology Institute.

The Delaware Tradition of Excellence embodied in the Chemical Engineering program continues to help mold UD's future with numerous, remarkable achievements of our faculty, students, and staff. Our three most recent hires, Terry Papoutsakis, Kelvin Lee, and Maciek An**toniewicz** are highly productive, as you can read about herein, and we are proud to celebrate Millie Sullivan winning the NSF CAREER award (number 14 for the Department) and Anne Robinson's promotion to the rank of Full Professor. We are also very pleased to have Prof. Michael Mackay (B79) join the department of Materials Science and Engineering with a courtesy appointment W.CHE.udel.e in Chemical Engineering. Please read on to learn more

about these and other achievements of merit by our faculty, graduate and undergraduate students.

I am also pleased to report that we have a record incoming graduate class (30 accepts) and a near record 109 (and still counting) incoming freshman class (Perhaps the record salaries offered the graduating class of 2008 have had an effect?). Our Energy and Biochemical Engineering minors are immensely popular and our undergraduate research opportunities serve to further engage our talented undergraduates in our mission of creating knowledge through scholarly research. From A to Z - Alzheimer's to Zeolites - the faculty, research staff, postdocs, graduate students, and undergraduate research assistants continue to imagine, invent, and innovate with world-class (and, as you can read herein, extra-planetary-class) research tackling some the grand challenges facing our society. You can learn more about this exciting research on our web site, as well as by visiting Colburn lab and perusing some of the over 50 research posters in the hallways that explain the work going on in the laboratories behind them.

With these highly visible leadership roles, groundbreaking research, and often unheralded, but valued service to the University community, the profession, and society, Chemical Engineering is leading the University on its Path to Prominence<sup>™</sup>. You, our remarkable alumni, are largely to thank for giving us this opportunity. Our current success, as well as the future success of our program is enabled by your valuable donations as well as by your contributions to society through your service, technical leadership and citizenship. Please continue to engage your alma mater, as we are proud of your achievements and welcome your input and suggestions. I and the rest of the faculty, students, and staff, as well as your classmates look forward to hearing from you!

Nam J. Wayne

P.S. Please consider joining us in celebrating the 100<sup>th</sup> anniversary of AIChE at the Delaware Alumni reception in Philadelphia and meet the new UD President, Patrick Harker, and don't forget to mark your calendar for the 75<sup>th</sup> birthday and retirement-fest for TW Fraser Russell.

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y comments for this year begin with a restatement of announcements that in February 2008, **J. Erik Fyrwald**, B81, became the chairman of the board, president, and chief executive officer of Nalco Company. Nalco is a leader in water treatment and energy services and related specialty chemicals with 11,700 people worldwide and sales of \$3.9 billion.

Prior to joining Nalco, Erik had a fabulous career with DuPont. He began as a production engineer, and between 1981 and 1990 he held various sales and management. In the next decade he was head of DuPont Nylon Plastics Asia division, the global leader DuPont Engineering Polymers, and finally VP for Corporate Strategic Planning and Business Development. In 2000 he became the VP and General Manager of DuPont's Nutrition and Health division followed by promotion in 2003 to VP of the Agriculture and Nutrition division.

### Rodney Chase, the interim Chairman of the Board for Nalco, announced the selection of the new CEO with:

"Erik Fyrwald brings to Nalco all of the qualities we sought in a CEO, including a strong, extended track record of success in large, global operations. He is both an exceptional motivator of people and a driver of innovation. His business acumen, strategic insights and commitment to sustainable development made this selection an ideal fit."

#### Erik Fyrwald's response was equally positive:

"With Nalco's water, energy, paper and air expertise, we have an incredible range of growth opportunities to pursue. I look forward to working closely with the Company's experienced and deep management team to fully capture the value that exists in these businesses."

Surely Nalco will be well served by this outstanding corporate leader.

Three alumni presented named department seminars this academic year. The three were Peter Flynn, Michael Strano and Brian Baynes.

**Peter Flynn**, B67, returned to the Department to give the 2007 Gerster Lecture on November 12<sup>th</sup>. This named lecture honors Jack Gerster for his successes in teaching, research and administration. Peter graduated with high honors and a degree with distinction in three years. Peter earned a MS at Berkeley (1968) and a PhD at Alberta (1974). He spent 25 years in Canada's energy industry before returning to the University of Alberta, where he holds the Poole Chair in Management for Engineers. His extensive research examines the price patterns in deregulated power markets and the economics of greenhouse gas mitigation, particularly through utilization of biomass. Peter's success closely parallels those of Jack Gerster, and hence his selection for this lecture.

### Alumni Coordinator Message



In his lecture, "Biomass Energy: Cost, Scale and Policy Issues", Peter examined the economics of abundant and underuti-

Jon Olson

lized biomasses for energy production. These include straw and corn stover, forest harvest residues, whole forests and manure. The approach also considered purpose-grown crops such as corn and switch grass. His analysis is a careful examination of the costs for growing the biomass, gathering it, transporting it to a process site, and selection of the process for recovering the energy value or converting it to fuels. Sustainable and carbon neutral routes to energy now have great research buzz but need to be illuminated by engineering economics.

On Friday, April 11th, Michael Strano, associate professor of chemical engineering at MIT, presented the Colburn Lecture. This lecture is to honor individuals who have achieved significant success in research at a young age, and Michael Strano clearly fits this definition. Michael earned a BS in chemical engineering at Brooklyn Poly in 1997 and his PhD at Delaware in 2003 under the direction of Hank Foley. He then had a post doc appointment at Rice with Richard Smalley, a Nobel Laureate who made major discoveries characterizing the structure and properties of nanotubes and buckeyballs. Michael was an assistant professor at the University of Illinois from 2003 until 2007, when he moved to MIT. He has won many awards including the Presidential Early Career Award (2005), the Coblentz award for molecular spectroscopy (2006), the ACS award for excellence in colloidal science (2007), and the Young Investigator award from the Materials Research Society (2008).

Michael's seminar was titled, "The Chemistry of Single-Walled Carbon Nanotubes: Applications to Biomolecule Detection, Nanotube Separation, and Electronic Networks." Carbon nanotubes can be used as unique detectors. For example DNA adsorbed on a nanotube may undergo a structural shift, which can be followed by measuring the fluorescence in the near infrared.

Strano's group has shown how networks of nanotubes can be flexible electronic devices and chemical detectors. These devices are exceedingly sensitive to their environment, apparently adsorbing entities both reversibly and permanently. At this writing Michael is

### **ALUMNI COORDINATOR MESSAGE**

featured on the MIT Chemical Engineering web page for his recent research success in developing an ultra small and extremely sensitive sensor for sarin and other poisonous gases.

Michael's work clearly is cutting edge, and his command of spectroscopy and material science is leading to novel uses and more complete understanding of single wall nanotubes (SWNTs in the vernacular).

On May 2<sup>nd</sup> Brian M. Baynes, B97, presented the 2008 Gerster Lecture, the second of the academic year. Brian was an outstanding student here: Degree with Dististinction, Panel of Distinguished Seniors, and multiple other undergraduate awards. He worked at Mobil during his undergraduate training and directly thereafter first implementing the automation of a 40 unit pilot plant and then connecting the molecular composition of crudes to supply chain optimization. In 2000 he entered MIT and earned his PhD in 2004 working with Bernhardt Trout and Danny Wang on protein stabilization. After MIT he joined Flagship Ventures in Cambridge, MA as a venture associate. His efforts there led to the startup of Codon Devices, first as VP and chief technical officer, and then as President and CTO in 2006.

Condon Devices has 75 employees at two locations in Cambridge, MA. His lecture was based his efforts there and was titled, "*Programming the Genome*".

Much of the current excitement in biotechnology stems from the identification the genomes of plants and animals. Condon Devices has developed a system for synthesizing genomes with customer specified sequences of up to 100K base pairs and potentially up to 1 M base pairs with extremely low error rates. This process is trade-marked BioFab. The other process is trade-marked BioLOGIC, which is library of rules and considerations which reduce the number of genomes needed to search a pathway possibility.

It is customary to comment on current students, and the Class of 2008 had many academic successes. Four graduated magna cum laude and five cum laude. There were six Degree with Distinctions (exemplary research) and nine Honors BChEs (scholastic distinction). In the fall the seniors found a relatively strong job market, and many obtained and accepted employment offers before the end of the year. The salary offers in the fall were strong, particularly in the petroleum industry and a little less so in pharmaceuticals.

Eight of the graduates are attending graduate school with five continuing in chemical engineering, two

attending law school and one seeking a MBA. Those continuing in chemical engineering will attend "top ten" schools. Of the 44 graduates all but three had at least one minor, six had three and two had double majors. The most popular minor was biochemical engineering (20), reflecting the emphasis on biological technology nationwide. Other popular minors were economics, chemistry and mathematics.

Junior **Jeffrey Bosco** won a Goldwater based on his research under the inspiration and direction of Jingguang Chen. Junior **Zachary Ulissi** was a member of the UD Math team that was in the top group (10 of 100+) in nationwide competition which is described as "difficult and intense". Senior **Asha Quant** was placed on the All East track team based on her exceptional skill in the long jump. She was the first UD athlete to compete in the NCAA East regionals since 2005. These examples reflect the range and depth of the skills of our undergraduates.

Jack Weikart suggested that some acknowledgment be given to the passing of two outstanding chemical engineering graduates, Jim Westwater and Skip Scriven.

James W. Westwater<sup>1</sup> was born in Illinois and earned a BS in chemical engineering in 1941 at Illinois. In 1943 he received his MChE from Delaware examining, "Oxygen Absorption in Plastic Films," and in 1948 he became the very first PhD from Delaware. His dissertation, "Flexural Testing of Plastics" was directed by Bob Pigford. He then joined the faculty at U. Illinois as an assistant professor, became an associate professor in 1955 and professor in 1959. He was department chairman from 1962-1980 and retired in1988. He was elected to the National Academy of Engineering in 1974, was given the Max Jakob Award jointly from ASME and AIChE in 1971, and the AIChE Walker Award in 1966. He was recognized as one of 30 distinguished chemical engineers at the 75<sup>th</sup> anniversary of the AIChE.

Westwater's research combined attention to physical fundamentals with superb and innovative experimentation. His high speed motion pictures of boiling heat transfer showed the formation, growth and breakaway of bubbles. This work gave a better physical understanding of the processes and improved correlation of heat transfer rates. He expanded his technique to study other forms of heat transfer including dropwise and flow condensation, nucleate, transition and flow boiling, Bernard cells, and freezing.

His career at Illinois in honored by a professorship in his name. He died at age 86 in 2006.

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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 <u>alumni-news@che.udel.edu</u>.

**L. E. "Skip" Scriven**<sup>2</sup> was born in California and earned a BS in chemical engineering at Berkeley in 1952. At UD he earned his MChE in 1953 and his PhD in 1956 under the direction of Bob Pigford. His dissertation was titled *"Interfacial Resistance in Gas Absorption."* He worked for Shell Development in Emeryville, CA before joining the faculty at Minnesota in 1959. There he rose quickly to professor in 1966 and became a Regents Professor in 1988, the highest honor UM gives to a faculty member. Skip died August 3, 2007 from pancreatic cancer.

Skip was devoted to undergraduate and graduate teaching. He championed team teaching, was very involved with the undergraduate unit operations laboratory. His 8:00a.m. graduate fluid mechanics course was unique and not to be forgotten: with his characteristic intensity, he continuously refined, polished and perfected this course.

Skip's research was broad and deep. He produced over 400 papers and 100 PhDs (including Eric Kaler), mainly centered on coatings and coating processes. He also contributed to enhanced oil recovery, capillary hydrodynamics, colloids and interfacial phenomena. His work spanned experimental studies, computer simulations, and meticulous physical analysis. His efforts earned him worldwide renowned, consulting opportunities, and invitations to present named lectures. He has an extensive list of awards: Colburn (1977) and Founders (1997) from the AIChE, and the Murphree IEC (1990), Tallmadge (1992) and Tess (2007) from ACS. He was elected to the National Academy of Engineering in 1978 and was a Fellow of the AIChE and TAPPI. His papers are exhaustive and penetrating: they include a review of the pertinent literature, an efficient presentation of the new ideas, and comprehensive illustrations of them. His work sets a very high standard for scholarship. The International Society of Coating Science and Technology established the L.E. Scriven award in his honor and to recognize young researchers in this field.

<sup>1</sup>Based on a NAE obituary written by Richard Alkire and Thomas Hanratty.

<sup>2</sup>Based on an obituary written by Jim Pirie and posted on the U. Minnesota web site.

The continuing assistance by Jack Weikart is acknowledged and greatly appreciated.

#### CLASS OF 2008 - WHERE DID THEY GO?

	30
Air Products (3)	
Axens NA (3)	
ExxonMobil (3)	
US Patent and Trademark (2)	
ABB Process Control	
AMEC	
BASF	
Biochem Technology	
Boeing, Polymers	
Dixon, Engineering	
Dow	
Edgewood Chemical Biological Center	
Fraunhoffer Reseach	
Hess	
Lehigh Cement	
MedImmune	
Merck	
Rodel	
Sartomer	
Sunoco	
Survice	
Telvent	
Valero	
ChEG GRAD SCHOOL	6
CMU (2)	
Johns Hopkins	
Illinois	
Nottingham (UK) Wisconsin	
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### **CLASS NOTES**

rthur L. Goldstein, M59, was inducted into the Alumni Wall of Fame at the Induction Ceremony held May 9, 2008. Arthur Goldstein, a pioneer in water purification and separation technology, retired after 32 years as Chairman, President and Chief Executive Office of Ionics, Inc. He oversaw the company's growth from a small R&D company into an internationally recognized leader in water purification, desalination and separation technology. In 2005, Ionics was bought by General Electric for approximately \$1.3



UD Alumni Association Vice President Alan Brayman (second from left) with Alumni Wall of Fame inductees (from left) Lisa Rowen, Elizabeth Morris, Alex T. Bourdon, Arthur L. Goldstein and Carol Post.

billion. The holder of 18 patents related to the purification and processing of liquids, Goldstein was elected to the prestigious National Academy of Engineering, one of the highest professional honors that can be given to an engineer. Membership in the NAE honors those who have made outstanding contributions to engineering research, practice or education, and Goldstein joins 18 other UD alumni and six engineering faculty in achieving this recognition. A member of the Delaware Diamond Society since 2003, Goldstein was presented the UD College of Engineering Distinguished Alumni Award in 1996. Mr. Goldstein continues to play an active role in healthcare, education and business. He is a trustee, Treasurer and Chairman of the Finance Committee of Partners HealthCare System, a trustee at the California Institute of Technology, a trustee of the Massachusetts General Physicians Organization and a director of Cabot Corporation and many others.

**John Craven**, B66, replied to the 2007 newsletter with a note describing his career at DuPont, pointing out that in December 2006 he was made a DuPont Fellow, the highest rung on the DuPont technical ladder.

He started out in the Organic Chemicals Division. When asked if he was an exceptional student of organic chemistry, he replied: "My memory is that all the ChEs flunked organic chemistry first and had to repeat. I got D's on first try and didn't have to repeat. Why DuPont chose to start me in Ponsol Dyes is unknown to me."

In 1978-1981 he was a key member of a team that built the Phthaloyl Chloride plant at the Chambers Works (intermediates for Kevlar and Nomex). He describes this work as his most satisfying success. "Nothing tops developing a new facility and starting it up successfully."

John's path up the technical ladder began as a R&D Engineer in the Titanium Technologies division. In 1996 he became an Engineering Fellow followed by promotion to Senior Engineering Fellow in 2002. His elevation to DuPont Fellow in 2006 was in recognition of his significant contributions to developing profitable technologies. He emphasized that his expertise is not in producing pigment (TiO<sub>2</sub>) but in processing byproducts generated via the DuPont chloride process. The DuPont chloride process starts with low grade titanium ores and converts them to TiCl<sub>4</sub> and other easily separated byproducts. This dual beneficiation and purification gives a huge cost advantage to competing chlorine processes which start with high grade ore to produce TiCl<sub>4</sub>.

John has been recognized for his work on underground injection of the biproducts of the chlorine process. In 2002 John led an effort to demonstrate the underground injection is the best sustainable process for treating certain wastes from the chlorine process, and EPA concurs with this assessment. The new DuPont titanium plant in Mexico is using underground injection with the approval of the Mexican government, and underground injection will be used for a one billion dollar plant planned for 2010 startup in China.

John also was cited for his contributions to highly acidic aqueous processing (two patents), high temperature ore processing, and a general approach for process development called Pace for Progress. Whereas the DuPont Pace program covers manufacturing, Pace for Process rigorously addresses the development phase and its transition to commercialization.

In 2005 John initiated an Innovation Award Program for the Titanium Technologies department. His goal was to stimulate technical innovations which yield step changes in profits. The program made a \$1MM increase in profits each year since inception, a clear success.

John notes that he has worked extensively with Bert Diemer, Jim Dyer, Art Etchells, Rich Grenville, Steve Grise, Jim Tilton, Noel Scrivner and others. These names

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are familiar to many in the UD chemical engineering community.

**Michael. Todd**, B73, is now an Engineering Project Manager for Jacobs Engineering Group on Baton Rouge, LA. He is married to Carla, and they have two children, Alexander (1978) and Kathryn (1980). In a letter to Fraser Russell, he commented (edited):

We're still in Baton Rouge. I'm loving work, and I think I'm holding my own with respect to Jacobs' expectations. I'm starting to feel like one of the journeymen on the staff, which is my career objective. I'm presently in the seam between assignments. I'm being proposed to other clients for new work, of which there is plenty - so no worries about having something to do - just waiting to see what it'll be.

On the family front, Carla and I are doing fine; getting more and more acclimated to life here in Baton Rouge. There are a lot of positives from standpoint of work, friendly people, mild winter weather, year-around golf, restaurants & entertainment here (broadly speaking includes New Orleans & Houston), and the LSU culture here in town. But as with any location, also some drawbacks. It's just not a well-run jurisdiction.

My son Alex (29) has become something of a control systems guy & is now my favorite Chevroid! He starts Dec 3rd with Chevron in their Engineering Technology Center in California for 2 to 3 months of indoctrination. Then he expects to take on a 28/28 rotating assignment to one of their scenic destinations (Angola or Kazakhstan).

My daughter Katie (27) is in Maryland, happy as a clam. Don't see her nearly enough. She's married, teaching school, very involved in church activities with her husband. No grandchildren yet.

On April 7, 2008, Foamex announced that **David Prilutski**, B75, was named Executive Vice President and Chief Operating Officer reporting directly to Jack Johnson, President and Chief Executive Officer. The press release included a salutary statement from President Johnson: "We are indeed fortunate to bring a strong, proven leader of Dave's caliber to our organization at a time in which we are implementing and executing our growth strategy. Dave's depth of industry knowledge, international experience, versatile operations background, and demonstrated ability to create high performance, team-based work environments will bring great value to Foamex."

Dave's career started with Arco Chemical where he had many assignments of increasing responsibility. These assignments included engineering, R&D, manufacturing, marketing, sales, strategic planning and finance. After Arco was acquired by Lyondell he served as Director of Research and Development from 2000 to 2003, Vice President, Supply Chain from 2003 to 2006, and as President of Lyondell – Europe with additional global responsibility for Lyondell's styrene and isocyanate business from 2006 to 2008. The last position encompassed businesses with \$7.5 billion sales. Dave served as Senior Vice President and Acting Chief Financial Officer of Foamex for six months of 2000 when Foamex had the potential of going private. He rejoined Lyondell when the transaction did not materialize.

**Thomas F. Degnan Jr.**, PhD77, was honored as a "Hero of Chemistry", by the American Chemical Society (ACS). The ACS Heroes of Chemistry program recognizes chemical scientists whose work has led to the successful innovation and development of commercial products. The 2007 honorees were recognized August 19 during the ACS meeting in Boston.

Tom is manager of Breakthrough and New Leads Technology at ExxonMobil R&E in Annandale, N.J. He joined the Mobil CRL in Princeton in 1980, moved to Paulsboro in 1989 where he went from group leader to scientist to manager of Mobil's Catalyst Technology Group. In 2000 he moved to the ExxonMobil lab in Annandale where he has served as laboratory director and manager with increasing responsibilities.

The award was given to a team under Tom's direction that developed the PxMax process for converting toluene to para-xylene at high yield and reduced cost. The team developed a unique process for making the PXMax catalyst.

"Instead of producing a mixture of xylenes comprising 25 percent para-xylene, typical of conventional, equilibrium-limited toluene disproportionation processes, PxMax can produce para-xylene selectivities in excess of 90 percent," Degnan said. "It does this through a permanent selectivation process that produces catalysts that discriminate between differences in xylene isomers through structures controlled to less than 0.01 nm (0.1 Angstrom)--nanotechnology at the 'sub-nano' scale. The catalyst is extremely stable and rarely requires regeneration. Several units have been running longer than six years without shut down or regeneration."

"Besides the gain in yield, PxMax also has important environmental benefits," Degnan said. "The process generates less waste by reducing the energy needed for para-xylene separation. The process significantly reduces plant carbon dioxide emissions, a considerable benefit at a time when concerns about global warming are increasing."

### **CLASS NOTES**



"I was very fortunate to be a member of a highperforming interdisciplinary team that was composed of several chemists, a

ceramics engineer and two chemical engineers," Degnan said. "It's one of those experiences in life that you reflect back upon with pride, but which, when you are in the heart of it--in this case technology development driven by a significant business opportunity with very aggressive timelines--you feel overwhelmed by the challenge and the time pressures." -Taken from a U. Delaware press release by Martin Mbugua.

**Linda Myrick**, B77, was a member of the panel, "In the Company of Women", at the May 10<sup>th</sup> Forum on the Future of the University. The panelists were asked to "... review their careers focusing on how they dealt with the gender bias that keeps women from filling more positions within America's corporate hierarchy."

Linda began her career with Procter & Gamble as a product development engineer. She spent 20 years with FMC Corp., a diversified chemicals and machinery company, in positions of increasing responsibility, including general manager of FMC BioPolymer Pharmaceuticals, a global pharmaceutical ingredients business.

In responding to gender bias question, Linda noted she resigned after 20 years with FMC when a man was given a promotion she felt she deserved. Her resignation was turned down, and instead, she was given the job she wanted.

"I had to quit in order for them to do the right thing," Myrick said. "I hope when I come back 10 years from now it will be less unique for us to be up here talking about our careers."

In 2001 Linda joined Rhodia Inc., a specialty chemicals company headquartered in France, as Vice President and General Manager of Specialty Phosphates, NA, and later was named Vice President and General Manager of Home, Personal Care and Industrial Ingredients, NA. This fall she became Vice President and General Manager of Air Liquide LP when Rhodia was acquired. Linda also serves on the Advisory Council of the Department. *-Based on a UD press release* 

On February 9, 2008, **Michael Mackay**, B79, gave a seminar to the Materials Science Department. The seminar, "Dynamics and Thermodynamics on the Nanoscale", was very well received, and on the basis of this and his distinguished research record, Mike, a nationally recognized expert on nano materials (www.nanoeverything. com), has joined the Materials Science department this fall as professor. He also has an appointment in chemical engineering since his work spans both departments.

Mike's seminar answered the question, "Is there anything unique about the nano (below 100 nm) length scale?", with a resounding yes for mixtures of polymers with nanoscale particles, provided the nanoparticle is smaller than the polymer molecules. These differences can give polymer blends with improved properties: lower viscosity, increased modulus, greater toughness, higher electrical conductivity and the like.

We are looking forward to Mike's future contributions to research and teaching. In his freshman year Mike did research with **Jerry Schultz**, and Jerry is still impressed by what was accomplished.

**Ajit Sapre**, PhD80, dropped into Colburn Lab in July to visit **Prasad Dhurjati** and bumped into **Stan Sandler** and **Jon Olson**. Ajit left ExxonMobil very recently to become Group President, Research & Technology, for Reliance Industries Limited. Reliance is a huge conglomerate company with headquarters in Mumbai.

Ajit described his responsibilities very succinctly: he will manage the transition of R&D spending of Reliance from 0.5 to 2.0 percent of sales (this seems easy to do) and is expected to earn 25 to 30% on these funds (this is very hard to do). Ajit is very sharp, has lots of energy and confidence, and it was easy to see why he was selected for this very important position. Ajit also earned a MBA from Cornell in 2001, surely as preparation for management at a high level.

**Michael L. King**, PhD80, was the Brent Halsey Distinguished Visiting Professor at the University of Virginia in the Fall of 2007. King has a long career at Merck & Co., Inc. in research, manufacturing, engineering, environmental and safety, strategy development, and change management. Most recently, he served as special advisor to the CEO and as Senior Vice-President, Science and Technology, Merck Manufacturing Division.

A July press release announced that **James J. Owens**, B83, joined the H.B. Fuller Company as senior vice president of the North American region. Fuller is a worldwide formulator and marketer of adhesives, sealants, paints and other specialty chemical products. In fiscal 2007 the net revenue of the firm was \$1.4 billion. Jim spent 22 years with National Starch adhesives division in various managerial positions including division vice president and general manager, marketing manager,

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and technical services manager. After Henkel acquired a portion of National Starch, Jim was responsible for the adhesives business in North America. He is the chairman elect for the Adhesive and Sealant Council, the premier trade association for the industry. Jim earned a MBA at Wharton after Delaware.

Michael Volpi, President and CEO of Fuller, announced Jim's appointment with: "We are delighted to welcome Jim to H.B. Fuller. His wealth of industry knowledge and commercial leadership, combined with his impressive track record of delivering results – double-digit profitability improvements for the past seven years - will be strong assets as we further develop and execute our customer-centric growth strategies. We look forward to working with him."

In an understated tone, **Nazeer Bhore**, PhD89, sent an email stating that in summer 2007 he moved from Potomac, MD to Coppell, TX to become a Senior Technology Advisor in Corporate Planning for ExxonMobil. This new assignment is a substantial achievement.

Nazeer's picture appears in a nationally distributed Exxon Mobil ad; examples are the July 19<sup>th</sup> *Economist* and the July 21<sup>st</sup> *New Yorker*. The purpose of this ad is to give attention to ExxonMobil's embrace of hybrids: "One recent innovation (from our scientists) is a new separator film that enables lithium-ion batteries to be used in hybrid and electric vehicles." Nazeer makes the observation: "In the U.S., if just 10% of the cars were replaced with hybrids, you're talking about reducing CO<sub>2</sub> emissions by the equivalent of taking more than five million cars off the road." Nazeer Bhore, engineer. The web link for this video is: <u>www.exxonmobil.com/</u> <u>corporate/news\_opeds\_20080624\_vehicle.aspx</u>.

On May 10<sup>th</sup> **William Provine**, PhD92, was a panelist in the session, "Alternative Energy: Key to Powering America's Future". This session was chaired by **Mark Barteau** and was part of the Forum on the Future of the University. Mark illuminated the need for alternative energy sources with the observations: "The world currently uses 400 quadrillion BTUs ("quads") of energy per year. With 3 percent of the world's population, the US consumes one-quarter of the total energy. Every day, the U.S. uses 20 million barrels of oil, 60 billion cubic feet of natural gas, and 3 million tons of coal. By 2100, the world will need three times the current energy production, and at a third of current carbon dioxide emissions."

Bill Provine is the Ventures Development Manager for DuPont Biofuels and DuPont Biosciences. He said DuPont is looking at biofuels as one near-term solution to energy needs. The predominant sources of ethanol include sugar cane in Brazil and corn in the U.S. DuPont also is working on turning "stover," the cornstalks and cobs, into biofuels. He also commented, "We need to make better biofuels than ethanol. We need to set up the infrastructure to get to the next level ." -Based on a UD press release.

Kim Brown, B94, attended the May 10 forum at UD describing President Harker's plans for the future of the institution. After Delaware she earned a PhD in chemical engineering at the University of Maryland College Park (2001), where she worked on the kinetics and thermodynamics of sol-gel rapid gelation. She currently is the CEO of Amethyst Technologies, a University of Maryland Baltimore County Techcenter incubator company (www.amethysttech.com). Her firm provides quality services for the production of pharmaceuticals, treatment of patients, and development of medical devices including master plan development, custom software, equipment calibration, sterilization and process validation, and other quality related services. Her clients include Walter Reed Army Institute of Research's Pilot Bioproduction Facility, United States Pharmacopeia, Next Breath, and many others.

**Sarah Bannister**, B95, reports her current activities as a second-year associate with the Washington, D.C.-based law firm, Covington & Burling LLP. In her first year at the firm, Sarah was in the firm's corporate practice group, where she worked on mergers and acquisitions and advised clients on compliance with SEC regulations. Since February 2008, Sarah has been on loan from Covington to The Children's Law Center, a Washington, D.C. nonprofit organization focusing on children in the D.C. neglect and abuse system. During her time at The Children's Law Center, Sarah has represented foster parents of children in the neglect and abuse system and individuals.

This tombstone writing certainly is appropriate for formal announcements, but it doesn't sound like Sarah, who always writes with a bit of spunk. She further wrote in her note:

This stint at CLC has been a blessing. I've learned quite a bit over the past few months, and I've gotten some decent courtroom experience. Family court tends to be a little loosy-goosy, so the ability to make arguments that have a modicum of logical organization is a huge benefit.

The most important thing I've learned, however, is that it really sucks to be poor in this country. Almost all of my clients are single, African-American women in their 40s-60s living in Anacostia or Prince George's County, and who are struggling to get by and take care of other people's children. It's a vastly different world than the

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one that I usually inhabit in Northwest DC. It constantly amazes me how easy it is to make a child, and how hard it is to keep that child safe and healthy.

Xiao Feng Wang, M95, PhD95, wrote recently that she left Centor for a position at Novartis in their research center in Florham Park, NJ. Currently she is in the Clinical Pharmacology section of the Oncology Business unit. As a Senior Fellow, her responsibilities are to support clinical trial study design (Phase 1 to Phase 3) and to support drug registration, submission and filing. Since graduation she has been applying the mathematical modeling developed by **Ken Bischoff**, her advisor, in the sixties to pharmacology. She describes the growth of the field as follows:

The widespread application of PK/PD (PharmacoKinetics and PharmacoDynamics) modeling/simulation studies started about nine years ago. In the beginning people in the pharmaceutical industry couldn't tell the difference between "modeling" and "simulation". It took about five years to educate people in the field how to apply modeling/simulation to improve clinical trial design. Today, the majority of large pharma and biotech companies have built modeling/simulation teams either within the pharmacology department or as a separate unit. The application of modeling/simulation today is used not only to improve clinical trial design, but also for filing, where drug labeling (adjustment of dose based on various factors) is a critical issue.

If Ken Bischoff had remained healthy, he would have contributed much more to this industry. It is very difficult to find people who knows how to do modeling/ simulation. Most people working in this field are trained either in math/statistics or pharmacology. The former are poor in mechanistic modeling, and the later don't know mathematics, and neither know process analysis. Hence I always tell people that chemical engineering is the best training for work in this field.

I finally caught up with **Rachel (Powers) Causak**, B96, who described her career since UD as follows: Kevin and I got married shortly after graduation, and celebrated our 12<sup>th</sup> anniversary this past summer. Kevin continues to work as a Tool and Die maker, and still races mountain bikes. In June of 2006 we welcomed our first child, Benjamin, now 26 months old. He has certainly changed our lives in the wonderful way that only children can. He loves to take things apart and try to put them back together – I call him "my little engineer" – look for his application in about 15 years. We hope to have at least one more in the next few years.

After graduation from UD, I went on to medical school at Penn State, and following graduation did a double residency in Pediatrics and Internal Medicine at Penn State Milton S. Hershey Medical Center, and I am now Board Certified in both. I also was Med-Peds Chief Resident in my final year of residency, and then stayed on for an additional year in a largely teaching role as Internal Medicine Chief Resident – an extremely rewarding year.

After my son was born, I had to make some tough decisions on what was best for me and my family. I am currently working as a Primary Care Internist at the Lebanon VA Medical Center, in Lebanon, PA. Although working for the government has its share of frustrations and challenges, it also has several benefits, including no nights, weekends or holidays – almost unheard of hours for a physician. This allows me plenty of time to be home with my son, without worrying about being called back to the hospital.

The caring for the veterans has been very rewarding. It seems all of them have stories to share – and my patients include survivors of Pearl Harbor and D-Day, to Tunnel Rats in Vietnam as well as 20 year olds coming back from Iraq. The vets are extremely appreciative of the care, and for many, the VA is the only source of medical care they have.

There is certainly no lack of pathology, and I am continuing to learn a lot, just by trying to stay on top of issues related to my patients – the diversity and complexity of their medical problems keeps things interesting and challenging. When you add in the various chemical exposures and infectious disease concerns based on where they served overseas, diagnoses and treatment are rarely straightforward. I am also the Women's Health physician, so although my practice is largely men, I have many more females than most VA doctors.

On May 9<sup>th</sup> **Deborah Moore**, B96, received a College of Engineering Outstanding Alumni award. She entered chemical engineering as an adult student with more



than ten years experience at W. L. Gore & Associates. During her four-year undergraduate program, Debbie's industrial background gave her a unique motivation for learning and enriched the education of her fellow students.

Returning to W. L. Gore after graduation, Debbie assumed the role of New Product Development Engineer. In that capacity, she contributed to numerous projects including, most recently, fuel cell technologies. Working with a team that has been the leading membrane-electrode assembly supplier to the fuel cell industry, she co-authored several publications and presented findings addressing the many technical challenges in the industry. Her work has moved the fuel cell industry closer to achieving its commercial goals.

In addition to her work at Gore, Debbie is a GED Math and Science instructor and is a Literacy Volunteer teaching English as a second language to adults, thereby living out her commitment to helping others take advantage of life-long learning opportunities. Debbie attributes her achievements to the support of her grandparents, parents, late-husband, and children. *-Based on a citation written by Kathy Werrell.* 

Katie Gaston, B97, recently moved to Golden Colorado and reports: I joined the National Renewable Energy Lab (NREL) in Golden, CO in July 2007 as part of the National Bioenergy Center (NBC). I'm working as an engineer in the Thermochemical Process Development Unit (TCPDU... everything is an acronym), a pilot-scale facility where we research gasification of cellulosic biomass (e.g. agricultural residues, energy crops, and forest product wastes) to syngas, which can then be turned into transportation fuels via catalytic conversion. We have some aggressive research targets in order to meet the 2012 cost-competitive ethanol goal, and now the Energy Independence and Security Act of 2007 goals, but everyone here is very driven to meet our goals and a pleasure to work with. We have some incredibly motivated and talented scientists and technicians. There aren't many other UD CHEGs though, so send some our way! I'm also really enjoying the snowboarding and outdoor sports out here.

When asked if Katie had visited the Coors brewery in Golden, she replied: I have not yet toured the Coors brewery. When I tried in 1997 (along with Brian Baynes and Holly Weidenaar) while on a ski trip here, it was closed. There are so many good beers around here, and I've graduated to snooty beer since college, so the Coors tour has not been high on my list.

Mark B. Shiflett, M97, PhD02, was one of seven UD alumni honored with this year's **Presidential Citation** for Outstanding Achievement Award. The October 12, 2007 ceremony honored the seven recipients for their dedication to public service and professional contributions. Mark is a researcher at the DuPont Experimental Station in Wilmington. Mark and his research team developed new refrigerant mixtures to replace the CFCs and HCFCs that were linked to the depletion of the earth's ozone layer. The new refrigerant mixtures are non-ozone depleting, as well as nonflammable, with low toxicity and good thermal stability.

**Sujata Bhatia** has been very helpful in making contact with other CHEGs. She was approached last fall at a press conference in Wilmington by **Michelle Bryner**, B98, serving as a reporter for *Chemical Week*. From this connection, Michelle described how she got into journalism: I worked at W.L. Gore and Associates for six years (June 1998 – August 2004), during which time I had the opportunity to explore several different areas of engineering—product development, process development, and process engineering. I loved it and the reason I decided to go back to school had nothing to do with not liking my current job. The people I worked with and projects I was involved with were challenging and exciting.

For some reason, however, I felt like there was something missing. At that time, my twin sister (Jeanna) was at NYU getting her master's in science and environmental journalism. She would talk to me about her assignments—writing features and news stories on a broad range of topics. I ended up following in my twin sister's footsteps. I went to NYU and graduated in December 2006 with a master's degree in Science and Environmental Reporting Program (SERP).

Currently, I am an associate editor for *Chemical Week*, a weekly trade publication written for the executives of international chemical companies. I am responsible for writing the Innovation page as well as news stories that have a science/technology angle. Over the past two years at CW, I've gained experience writing on deadline, as well as knowledge about the business side of science.

My long-term aspiration is to write and edit at a consumer publication, whether online or in magazine format. Toward this end currently I am also freelancing for *Popular Science* magazine.

When I asked **Christy Prilutski**, B98, for a contribution for the news letter, her reply was: "How about this.... Engaged!!!" A few days later, she expanded her reply.

As for me, I'm wrapping up my second year as a Product Manager in Supply Chain for Johnson & Johnson's drug-eluting stent business (a billion dollar business in the past). These two years have been quite demanding but intellectually stimulating as we survived turbulent market dynamics with the rise and fall of safety concerns and the entrance of three new competitors. Luckily I've outlasted my first round of bosses and now am starting to feel like an 'old dog' in this business. The world changes so much faster in the med device in-

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dustry compared with my background in chemicals! I'm starting to think about new challenges and a possible relocation back to the northeast, or maybe even back overseas. J&J has significant depth in the northeast region, but my warm-climate-loving fiancé has some other location ideas.

We've enjoyed Miami - the beach volleyball and moonlit kayaking, but are ready to move on to our next adventure! Will's father and two brothers live in China so we're contemplating a short-term career opportunities in Asia as well. Stay tuned - by this time next year we'll likely be in a very new place.

**Aaron Sin**, B98, reports a recent job change: Just a quick update that my wife Ash and I have moved to St. Louis. I am now working in Sigma Aldrich on business development (in- and out-licensing) of technologies related to proteomics. I bought a house (finally), a 3 br ranch with a 10,000 ft yard -- much more than I could ever dream of when I was in New England. I do have to iterate that I am still primarily a Red Sox fan.

We are looking for another person to join our group in Strategic Marketing. If you know someone who has a science background and business degree / experience and is interested working on marketing / business modeling as a Strategic Marketing Analyst -- please let me know.

**Sujata Bhatia**, B99, M99, found seamless way of avoiding saying, "I got promoted!" Instead she attached the formal announcement:

"Effective May 1, Sujata K. Bhatia is promoted from Medical Research Scientist to Research Associate. She is being recognized for her technical breadth to work across the chemical engineering, biology, biochemistry and specifically, mammalian and bacterial cell cultures workstreams to insightfully lead the tissue/material interaction challenges in the medical projects. Sujata is currently split (between) working on APEX 621 (Bioadhesives) and APEX 909 (Adhesion Prevention); she was previously the team leader on both of these projects. Sujata quickly translates concepts to practical solutions, brings a physician's perspective into the biomedical effort and is a valued member of the Biomedical group. Please join me in congratulating Sujata on the well-deserved promotion. "-George K. Kodokian, Research Manager, MSE, E.I. DuPont

Congratulations, indeed, Sujata.

In October **Jason Baxter**, B00, sent a note updating his career: I began this fall as a new faculty member in the Department of Chemical and Biological Engineering at Drexel University. My research focuses on the growth of semiconductor nanomaterials and on electron trans-

port in nanowire dye sensitized solar cells. I became interested in these solar cells way back in 1999-2000 while doing my senior thesis at UD with Fraser Russell, and I have been investigating some aspect of the topic ever since. I earned my PhD from UC Santa Barbara in 2005, working with Eray Aydil. This summer I finished my two-year ACS PRF Alternative Energy Postdoctoral Fellowship in the Chemistry Department at Yale University. This fall I am teaching heat transfer and frequently think back on all the days I spent in Colburn Lab.

In 2003 while at UCSB, I married Joy Schramm, who was also a PhD chemical engineering student there. Our daughter Lauren was born February 28, 2007 and she is doing very well. Whether chemical engineering is passed on by nature or nurture, she seems doomed either way. She certainly is very curious. We are living happily and busily ever after in Havertown, PA.

Ed Gatzke, PhD00, is at U. South Carolina, and currently is on a Humboldt in Germany. He writes: I finished my PhD at UD in 2000 with Frank Doyle and went to MIT to post-doc with Paul Barton. I started at USC in 2001 and I was tenured and promoted to associate professor in 2007. I received a NSF Career award in 2003 for "Mixed-Integer Nonlinear Programming Approaches for Hydrogen Production systems." My research group has developed optimization methods and control techniques for problems related to power production. We typically use global optimization methods to guarantee that we have found the best solution to the design or control problem. These numerical methods are flexible, so my group has examined applications including power production, metabolic modeling, particulate processing, and traditional distillation column operation.

The Alexander von Humboldt Foundation recently awarded me a Research Fellowship for Experienced Researchers. The title of my Humboldt project is *"Design* and Control of Power Systems Using Advanced Optimization Methods." This work will mostly be completed at the University of Stuttgart with professors Frank Allgöwer and Ulrich Nieken. Additionally, I plan to spend some time at the Fraunhofer ISE in Freiburg working with the group of Christopher Hebling examining issues related to power system design and operation.

The Humboldt fellowship has a strong cultural component. Research fellows are eligible for two months of intense language training and a two-week study-tour. The Humboldt foundation has an annual meeting in Berlin for research fellows and their families which includes a reception given by the President of the Federal Republic

#### of Germany.

Andi, Drew (3), and Ellie (1) will be with me in Germany from May 12, 2008 to August 1, 2009.

Those in the 2000 Class will remember when **Matt Woolley**, B00, decided that ECON was more interesting than CHEG. He replied to a request for why he went to the "dark side" with the measured response that follows:

I did get a PhD in economics from UNC-Chapel Hill, and I concentrated in financial econometrics. The title of my dissertation was *"Essays on Life-Cycle Portfolio Choice with Endogenous Retirement."* 

I actually don't rate any bonds at Moody's (response to my snide comment) - I work in the Credit Policy/Credit Modeling group. It's a lot of yield curve fitting and asset pricing, and especially now, it is an interesting time to be involved in credit.

Regarding the transition from CHEG to ECON...easy. The problems tend to be the same; there are a lot of similarities to process control (forgive me if I am bungling the name of the field). The mathematics are closely related, although there is more emphasis on optimization overall in economics than in CHEG.

The main part is just getting the jargon right...once you get the new language down, the problems are pretty similar. Regarding my path to the dark side, John Bergman and Richard Weinacht helped develop my interest in math, and it was a winter session trip to England/ Western Europe that introduced me to economics (I have Charles Link and David Black to thank for that).

Alright - back to solving the sub-prime crisis. Written Friday, Oct. 19, 2007, before most of us knew what the sub-prime crisis was.

**Brad Taylor**, B01, lives in Tulsa, OK and works in Bartlesville, OK where he works for ConocoPhillips. He reports: Tulsa is a reasonably cosmopolitan place to live. The University of Tulsa and the civic activities bring in a lot of interesting events. For being a small town, Bartlesville also has a pretty strong community that brings in interesting bands, orchestras and performances. For being an east coaster at heart, life in Oklahoma has been good. It does not hurt when you like your job. I have been lucky to be able to examine things far more fundamentally than I had expected industry to allow me.

As for my work, the Advanced Hydrocarbon Fuels group within ConocoPhillips endeavors to anticipate future transportation fuel needs through a combination of medium and long range research. Medium range research assesses the future impact of regulatory actions on refinery functions and targets research areas that help to make compliant fuels efficiently. The long term objectives are to assemble a database of technologies that allow targeted, selective treatment of individual fuel components. This molecular toolbox of selective processes combined with fundamental work on future engine configurations, leads to making current fuels from atypical feedstocks and to prepare for the transition to future transportation fuels unlike the current slate of products.

Suffices to say, new engine configurations (HCCI, for example) and new environmental regulations (MSAT II, for example) as well as the emphasis on low carbon and bio-carbon containing fuels stands to have a significant impact on conventional refinery operations.

**Ivan Baldychev**, B02, a former member of the UD Men's Rowing Club, finished sixth in the World Rowing Championships held Aug. 26-Sept. 2 in Munich, Germany.

A University of Pennsylvania graduate student in chemical engineering, Baldychev said that a typical sixday training week involves working out for a minimum of at least an hour each morning and evening.

Rowing at UD was a rewarding experience, Baldychev said, because it gave him a great sense of community while doing something he really enjoyed.

"Rowing at UD was a lot of fun. We traveled a lot and met a lot of very interesting people," Baldychev said. "Rowing also brings out the best part of your character. By trying to do your best, you help the team do better."

**Chris Burket**, B02, wrote: After graduation I continued my chemical engineering education in graduate school at Penn State, where I was advised by Hank Foley. I defended my Ph.D. in July of 2007. My thesis was titled *"Genesis and evolution of porosity and microstructure in nanoporous carbon derived from polyfurfuryl alcohol."* I've published three papers and received one patent so far based on my work. A few more items should be on the way soon. In October I began my post-school career. I am a research engineer at DuPont Central Research and Development in Chemical Sciences and Engineering. I run into U of D chemical engineers everyday. It's great!

Chris also noted (in the Alum Directory form) that he is engaged to Heather Katen, UD 2004 in Psychology.

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**John Heinzel**, B02, sent a picture taken at his wedding with (an edited) caption:



John and Cari Loveland ('04HS) were married on June 29, 2008 in St. Thomas, USVI, where Cari was born and raised. John is with the U.S. Navy, earned a MS at Rowan University, and now is working towards a Ph.D at Auburn University. Cari received her doctorate in physical therapy from Drexel University, specializing in pediatrics, and currently practices near their home in Collingswood, NJ. UD CHEG **Ian Peek**, B2002, was in attendance.

John Butow, B03, answered the request for information with: I have been with Environmental Resources Management for three years working as an air quality consultant. Aside from assisting local clients with permitting issues and helping out the contaminated site remediation and due diligence groups, my most recent focus has been compliance related auditing of Leak Detection and Repair programs at petroleum refineries and chemical manufacturing facilities. I have been working as the lead field auditor on the LDAR program audits for all of the Sunoco and Valero refineries located in the domestic United States.

I recently ran into **Shannon Eggers** (B03) at the Valero Delaware City refinery (where she is part of their environmental staff) in April of this year when I was at that refinery for an audit. I think she was just as surprised to see me as I was her!

**Noelle Comolli**, B03, wrote the following update of her career: I graduated from Drexel with my PhD in chemical engineering in August 2007 (my thesis was: Engineering a multifunctional scaffold for spinal cord repair). This year I have been doing a post-doc at the Drexel College of Medicine, Neurobiology & Anatomy department working on biomaterial designs to support spinal cord injury repair strategies. The more exciting news is starting this August I will be an Assistant Professor at Villanova University in the Chemical Engineering Department. I am teaching heat transfer this fall, and developing a biomaterials & drug delivery class in the spring. As for at home, I spend most of my time with Evan, who is turning 6 this July. He just finished kindergarten, and he loves school (esp computers & science). He is also really into baseball. He is a big Phillies fan and cannot wait to move up from t-ball to little league.

Lauren Dagostino, B03, described the last five years with: I have been with Honeywell since I graduated; transferring from their Delaware plant to a plant in Virginia. I have been in Virginia for almost three years, working in various process/production engineering roles. It is a very large facility that manufactures caprolactam (a raw for nylon-6) and a few other intermediates. I am pursuing my MBA part-time at the University of Richmond, Robins School of Business. I am on track to graduate in May 2009, so less then one year left!

**Katie Garvey**, B03, responded to the request for news letter material with: To date, 2008 has been an extremely eventful year. My boyfriend of seven years, Dave, finally proposed on January 2<sup>nd</sup>. We are getting married on June 13, 2009, and I am honored that Lauren Dagostino will be one of my bridesmaids. I am also in the process of relocating/transferring to Pittsburgh.

Professionally, I just celebrated 5 years of service with Malcolm Pirnie, Inc., working as a Project Engineer on the National Buried Infrastructure Resource Team.

Eric McLeod, B03, describes the last five years with:

After graduating, I went to work with Air Products and Chemicals right down the road from UD in Elkton, MD. For one year, I worked as a process engineer at a polymers plant which produces industrial adhesives and coatings. It was very nice to have many good friends and the old stomping grounds so close to home.

Next, I made a big move out west to work for Air Products Electronics Chemicals Division in Colorado. Shortly after the move, I bought a house in Colorado Springs and worked as production supervisor at the plant for three years. This past spring, I graduated with an MBA degree from the University of Colorado. While the program itself was not as challenging as the CHEG curriculum, it has certainly been a very busy two years of attending classes while working full time.

Most recently, I have made a transition away from manufacturing operations and now work in the business environment as product manager. Our division was acquired by a much smaller company, KMG Chemicals, on Jan. 1, 2008. The transition to the new company is well underway, and I continue to enjoy the variety and new challenges that my current position offers.

I spend much of my free time in Colorado enjoying the wide range of recreation that the surrounding mountains have to offer. During the winter, I venture to my "home away from home" in Breckenridge and enjoy the great skiing at the 5 nearby resorts that are included on my season pass. It's great to feel like you're on vacation every weekend

**Dan McManus**, B03, is working for the Barry Wehmiller Design Group in King of Prussia, PA. He wrote the following note: I have worked as a process controls engineer since graduating and have traveled as far as China for work. I currently spend most of my spare time fixing up my house. Hope everyone is doing well.

**Ben Tang**, B03, now a graduate student at Johns Hopkins, wrote a short summary of the last five years: My research at Hopkins focuses on the development of polymeric particles to be used for treatment of diseases in the lung, focusing on lung cancer. I am finishing up my 5<sup>th</sup> and hopefully final year here. My future plans are uncertain, but I have academic research in my sights for now.

**Steve Kestel** and **Laura Stafford**, both B04, were married on May 10, 2008. In responding to a request for further information, he said they just returned from their honeymoon in Hawaii. While they currently were living in an apartment in North Wales, PA, they were planning to buy a house this summer.

Laura earned a Masters in Engineering and Management from Case Western Reserve in 2005 and since then has been employed at Merck in West Point, PA as a product development engineer. Steve works for Bio-Chem Technology in King of Prussia, PA.

**Suljo Linic**, PhD04, received a DuPont Young Professor grant. He is a faculty member at the University of Michigan, Ann Arbor.

Dave Short was very impressed by **Jessica Penetar's** (B05) decision to become a Peace Corp volunteer after graduation. They kept in touch, and Dave asked Jess to present an informal seminar on her experience. She appeared on November 11 with a beautiful power point presentation on her time in the Dominican Republic (the "DR" to the "PC" veterans).

Jessica's project and experience were highlighted in last year's bulletin: <u>www.che.udel.edu/alumni.html</u>.

**Mark A. Snyder**, PhD06, finished his post doc appointment at the University of Minnesota and will become an Assistant Professor of Chemical Engineering at Lehigh. Mark is returning to the fold, as he is a 2000 grad from there. He plans to move to the area in July-August to formally begin his appointment in August.

He writes: I was fortunate enough to receive several offers (Colorado-Boulder, Houston, Tufts ...) that made the decision a challenging one. In the end, a promotion for my wife in her current job at a facility located in Bethlehem, PA and proximity to family made the decision to join Lehigh one that seemed to best optimize personal and professional factors for my wife and I.

Along the personal lines, I thought I'd share some recent exciting news...My wife and I are expecting our first child at the end of November/beginning of December.

**Jennifer O'Donnell**, PhD07, joins Iowa State University as a faculty member beginning this fall. Jen's area is micro-emulsion polymerization and focuses on control of polymer architecture.

Craig Schneider, B07, is a first year grad student at Johns Hopkins. While he is doing well academically, he also comments on the general notion that undergraduate UD thermo is a graduate course in disguise. He writes: My first semester of graduate school was pretty much what I expected; challenging but manageable. I would say about 70 to 80 percent of my workload was devoted to Thermo, by far the most challenging chemical engineering course I have ever taken. My other two classes, Advanced Cell Bio and Transport, were fairly easy and required little to no work other than studying before exams. During this semester, I learned the joy (sarcasm) of take home exams; I used to think these were a good thing...silly me. I had a rough start in my classes (mainly thermo), but finished the semester strongly and ended up doing very well.

In November, we were assigned our faculty advisers. I was very excited to be assigned to work for my first choice, Dr. Justin Hanes. The Hanes group is a gene/ drug delivery group that work on a variety of different delivery issues. Their most recent discovery has been the development of PEGylated nanoparticles that can efficiently traverse human mucus (for inhaled delivery to airway epithelia for treatment of a variety of diseases, including asthma and cystic fibrosis).

Research is going well. I am working mostly on the treatment of small cell lung cancer with nanoparticle therapies. I have been doing a lot of work with mice models, as we are testing our particles in mouse xenografts. Ironically, I am working with **Ben Tang**, a '03 UD CHEG grad, as I am taking over his area of research in the Hanes lab (lung cancer therapy) as he nears graduation. Best news of all. **Holly (Ungerbeuhler**, AS07, and sister to **Dana Ungerbeuhler Herrigel**, B03) and I are now engaged and plan to get married in June. Anyway, that is pretty much all that is going on for me now. I hope to catch some Orioles games soon, but lab is my life.

## 2008-09 New Grad Students

Anup Agarwal	Indian Institute of Technology, Guwahati
Woo Suk Ahn	Korean Advanced Institute of Science & Technology
Soobin Bae	Hanyang University
Marco Blanco	Industrial University of Santander
Beth Ann Cheney	University of Connecticut
Vinit Choudhary	Indian Institute of Technology, Bangalore
Scott Crown	Lafayette College
Andrew Foster	University of Washington
Stefan Gaida	Technical University of Berlin
Qian Gou	Beijing University of Chemical Technology
Brett Guralnick	Northeastern University
Elizabeth Kelley	Rensselaer Polytechnic Institute
Thomas Kelly	University of Alabama
Jung Min Kim	Hanyang University
Sarah Mastroianni	Lehigh University
Michael Mayeda	Harvey Mudd College
Jacob McGill	University of Maryland, Baltimore County
Patrick McNeely	North Carolina State University
Abbygail Palmer	Harvey Mudd College
Jun-Hwan Park	Hanyang University
Melissa St. Amand	University of Massachusetts, Amherst
Joseph Stanzione	Drexel University
Carrie Street	University of Oklahoma
Jonathan Sutton	Auburn University
Aditi Swarup	Manipal Institute of Technology / IIT Kanpur
Steven Traylor	University of Virginia
Sarah Tupy	University of Minnesota
Sonia Velez	University of Puerto Rico at Mayaguez
Jeong Jae Wie	Hanyang University
Weiting Yu	Zhejiang University China

### **2008 SEMINAR SERIES**

#### Feb. 15, 2008

Dr. Hugh Hillhouse - Purdue University The road to low-cost and High-Efficiency Solar Cells via Self-Assembled Nanomaterials

#### Apr. 11, 2008

Dr. Michael Strano (PhD03) (Colburn Lecture) -Massachusetts Institute of Technology

The Chemistry of Single Walled Carbon Nanotubes: Applications to Biomolecule Detection, Nanotube Separation, and Electronic Networks

#### Apr. 15, 2008

#### Dr. Robert Owens - University of Montreal

On the simulation of steady and oscillatory blood flow in a tube using a new non-homogeneous constitutive model

#### Apr. 18, 2008

Dr. Jeffrey Hubbell (Pigford Lecture) - Swiss Federal Institute of Technology (EPFL) Polymer and Biomolecule Design in Regenerative Medicine and Immunotherapeutics

#### Apr. 23, 2008

Dr. Catherine T. Hunt - Immediate Past President of ACS -Rohm and Haas Company

Sustainable Chemistries: Environmentally Friendly and Economically Viable

#### Apr. 25, 2008

Dr. Jong-In Hahm - Pennsylvania State University Engineering Nanomaterials for Enhanced Biomedical Detection

#### May 2, 2008

Dr. Brian Baynes (B97) (Gerster Lecture) - Codon Devices Programming the Genome

#### September 12, 2008

Sean Palecek (B93) - Wisconsin

Controlling human embryonic stem cell differentiation via chemical and mechanical cues

#### September 26, 2008

Carlos Rinaldi - University of Puerto Rico, Mayaguez Suspensions of Magnetic Nanoparticles: From the Nano- to the Macro-scale

#### October 3, 2008

Tom Healy (Wohl Lecture) - The University of Melbourne Colloid Science The Pointy End of Nanotechnology

#### October 31, 2008

Maria Stephanopoulos - Tufts On the catalytic activity and stability of atomically dispersed gold in cerium or iron oxide for the water-gas shift reaction

#### November 14, 2008

Alice Gast (Gerster Lecture) - President, Lehigh University

Why Complex Fluids are so Simple and Interesting

**MAP: Master of Advanced Materials** and Processes: An Elite Program at the Friedrich-Alexander University in Erlangen, Germany by Vincent Buerger, B07

fter finishing my Bachelor of Chemical Engineering at the University of Delaware, a lengthy road finally brought me to a Master program in Germany at the FAU (Friedrich Alexander Universität) in Erlangen, Germany, with considerable and much appreciated help from Professor Wagner and Professor Sullivan. The program is a special treat, a so called Elite-Master, with special funding from the German government, to invest research and education in new fields of science. The MAP program (Master of Advanced Materials and Processes) is attempting to bring together the still distant fields of chemical engineering and material science, providing the graduate with tools to be able to understand both fields in detail. A group of only nine people, we are surrounded by 17+ professors teaching their area of expertise, all in the English language. A relatively involved "Soft Skill Seminar" prepares the graduate further for self motivation, intercultural competence, and decision making abilities in a business environment.

The first semester is not without ease, as one has to catch up nearly all aspects of material science in only a few classes, including polymer science, electrochemistry and solid state thermodynamics, crystallography, and production and characterization of materials, besides revisiting the field of chemical engineering. This totaled to twelve lectures per week and gave little free time. However the lectures were done very personal and tailored to the student's need, which only this small class size allows.

Besides that, the University enjoys a great asset in the engineering department, the chair of particle technology with Professor Peukert. Via an antibody agglomeration based project, I had managed to work for one of the PhD students at his chair. We are currently working on molecular dynamics simulations of antibodies, and would like to study aggregation behavior of these complex molecules in various flows. Interestingly, the chair project is approached as treating the antibodies as particles. This work right now is only for a smaller semester project, but I am very much looking forward to finishing my Master thesis in his group. Professor Peukert had won the Gottfried Wilhelm Leibniz Prize in 2005, the highest German research prize awarded by the Deutsche Forschungsgemeinschaft every year since 1985 to scientists working in Germany.

At last, I would highly recommend this program to anyone who would like to study in a very central location in Germany and Europe. Many international students spend their weekends or vacations going to the European cities like Prague, Amsterdam, London, Paris, Berlin, Vienna, and Rome, all easily accessible via train or low budget airlines. For the Elite-Master, one has to bring the desire to learn about nearly every aspect of engineering and material science, rewarded by the excellent opportunity of starting research in new interdisciplinary fields of engineering.



This is a very special year. Not only is it AIChE's centennial celebration, but it's being celebrated in Philadelphia, PA. For these reasons, we've reserved Carpenters' Hall for **DELAWARE** our Delaware Alumni Reception. Alumni We would like to extend an RECEPTION invitation to alumni in hE100 the area. If you would Monday, November 17, 2008 be able to attend our Carpenters' Hall 320 Chestnut Street Philadelphia, PA reception, even if you are www.aiche.org/annual not registered for the AIChE meeting, please RSVP to Patti Hall, phall@udel.edu, by November 7, 2008.

7-10 p.m.

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## HOMECOMING IS OCTOBER 17-19, 2008.

2008 Class Reunions

The College of Engineering and the Engineering Alumni Association invite alumni and faculty to our annual homecoming luncheon in the President's Room at the Blue & Gold Club. RSVP to x2401 or engr-events@udel.edu. Also check out www.engr.udel.edu/home

The EAA Golf Outing will be on Monday, October 20<sup>th</sup> at the Deerfield Golf & Tennis Club in Newark, Delaware. The golf outing will benefit the Engineering Alumni Association Scholarship Endowment Fund. Download the flyer: www.engr.udel.edu/alumni/EnggGolfflyer%2008.pdf or Online Registration at www.engr.udel.edu/forms/alumni/golf\_reg.html

### WE HOPE TO SEE YOU!

This year's highlighted reunions: 50 year, 25 year, 15 year and 5 year – come join your former classmates at Homecoming!

#### CLASS of 1958:

Mr. William J. Baur, Jr. Mr. Richard L. Bennett Mr. Vladimir A. Bohdan Mrs. E. Lucille Carley Dr. Morton Collins Mr. G. James Davis Mr. John M. DeStefano Mr. Steven K. Evnochides Mr. J. Carey Hutchison, Jr. Mr. James L. Jacox Dr. Donald E. Jost Mr. Richard N. Meier Mr. Robert C. Mifflin, Jr. Dr. L. Philip Reiss Mr. W. David Robinson Mr. Raymond C. Sneller, Jr. Mr. John W. Terres Mr. Charles W. Watson, Jr. CLASS of 1983:

Mr. Timothy J. Ahn Mrs. Lori A. Althouse Ms. Melody A. Armstrong Mrs. Virginia B. Ashpole Mrs. Robin Barney Dr. Richard R. Barto, Jr.

Mr. Imre J. Berty Mr. Alan R. Bibeau Mr. S. Stephen Bitar Dr. Jeffrey L. Brinen Mr. Daniel Caramagno Ms. Barbara A. Carney Mr. Joseph R. Castagna Mrs. Elaine C. Caton Mrs. Katherine G. Chambers Mrs. Teresa R. Czerwinski Mr. Paul A. Darby Mr. James A. DeNoble Mr. Martin M. Doordan Mr. Ian R. Ednie Mr. Carl W. O. Eilo Dr. Elizabeth S. Fisher Mr. John W. Fisher Mr. Mark D. Franke Mr. G. Robert Graham Mrs. Diane C. Greene Mr. Laurent P. Gruet Mr. Franklin J. Gulian Mr. Wayne A. Gulian Mrs. Mary M. Hanlon Mr. Kevin J. Harrington Mr. Jeffrey S. Hess Mr. Jixian Hong Mr. Michael B. Hrycak Mrs. Susan K. Iocovozzi Mr. James E. Irons Mr. Stuart G. Jarratt Mrs. Jane L. Keller

Mr. Stephen L. Knupp Mrs. Michele R. Kreter Mr. Robert A. Lee Mr. John J. Livesey Mrs. Persis A. Lorenti Mr. Jeffrey L. Lucht Mr. John M. Lynn Mr. Jeffrey H. MacDonald Mrs. Elizabeth J. McClelland Michael R. McGurk, Esq. Mrs. Kim M. McMillan Mr. Michael M. McQuiston Mr. Craig K. Moffett Mrs. Kathleen D. Morris Ms. Melody L. Munson-McGee Mr. Anthony A. Murden Mr. Christopher M. Naro Mr. Christopher L. Nelson Mrs. Annette M. Orella Mr. Richard R. Polleck Mrs. Debra L. Raup Mr. Brian J. Russell Mr. Jude T. Ruszkay Mr. Mark A. Ryan Mr. Robert L. Sassa, Sr. Mrs. Maria A. Scott Mr. John M. Sentman III Mr. Michael B. Simmons Mr. Douglas R. Sommerville Mr. Michael W. Sweeney Jan Patterson Taylor, M.D. Mr. Peter B. Thompson

Mr. Alfred J. Thornton Mrs. Mary T. Tilley Mr. Kenneth J. Wascheck Mrs. Ann M. Wehner Mr. Harvey C. W. Wong Mr. E. Scott Yawger Mr. Tom J. Zaiser CLASS of 1993:

Mr. Marco V. Alban Mrs. Natalie M. Baker Ms. Mini Batra Mr. Thomas A. Blackwood Mr. Eric J. Charitonuk Mr. James G. Dilmore Mr. Leslie F. Excellent Mrs. Jennifer Gaalswyk Ms. Rachel D. Gar-El Dr. Dave A. Gayle Mr. Michael A. Goetz Mr. Mark Anthony Green Mr. Chad H. Hutchinson Mr. Dennis M. Kalayqian Mrs. Ginger Kamei Mr. John A. Kautz Mr. Todd M. Krieger Mr. Kearn P. Lee, Jr. Mrs. Susan B. Lopez Mrs. Jennifer L. McNay Dr. William J. Miller Mr. Duane B. Mvers Dr. T. Tucker Norton Mr. Sean P. Palecek Mrs. Christina B. Penrose Mr. Timothy A. Poludniak Mr. Frank P. Prenot Mr. Michael J. Rohr Mr. Leonard C. Schleicher Mr. Joseph K. Simoncek Ms. Susan M. Toner Rajesh Tuli, M.D. Dr. Christopher T. Williams Dr. Michael T. Yatcilla

#### **CLASS of 2003:**

Mr. Andrew D. Allerton
Mr. David C. Anderson, Jr.
Mr. Gregory A. Barker
Mr. John P. Bishop
Samuel N. Blacker M.D.
Mr. Brian G. Bush
Mr. John J. Butow
Mr. Dean J. Caravoulias
Mr. Michael A. Chajon
Mr. Chang-Ching Chan
Ms. Noelle K. Comolli
Mr. Martin J. Convey
Ms. Lauren L. Dagostino

Mr. Richard D. Dombrowski Mr. Brendan P. Donnelly Mr. Matthew W. Eggers Mrs. Shannon M. Eqgers Mr. Kenneth A. Fischer Ms. Roxana Y. Garcia Ms. Katherine R. Garvey Mr. Craig F. Gilbert Mr. Eric D. Godshall Mrs. Jennifer Zak Grey Mr. Christopher A. Guttridge Mr. R. Michael Hartley Mr. Everton I. Henriques Mrs. Dana J. Herrigel Mr. David A. Hindenlang Mr. Jason L. Jaworski Mr. Jun Jinkoji Mr. Jed JohnHope Mr. Michael J. Kelly Mr. John C. Kunkel III Mr. Timothy E. Lane Mr. Christopher W. McChalicher Mr. Eric B. McLeod Mr. Daniel F. McManus Mr. Mark D. Motyka Mr. Cory C. Mulcahy Mr. Sean M. Murphy Mr. Kevin Thomas O'Brien Ms. Kristel A. Orben Mr. Randolph A. Oswald Ms. Christina M. Picarro Mr. Eric M. Pridgen Ms. Heather A. Rumell Mr. Javier Salcedo Ledezma Mr. Adrien G. Salomon Mrs. Caroline P. Stockton Mr. Benjamin C. Tang Mr. Kristopher A. Unqvarsky Mr. Vincent J. Verruto Mr. Michael Wang Ms. Melanie B. Webb

Mr. John J. Yakubic

**UD IS NOW** MAKING SPECIAL **EFFORTS TO HONOR** ALUMNI/AE ON THEIR  $5^{TH}$ ,  $15^{TH}$ ,  $25^{\text{TH}}$  and  $50^{\text{TH}}$ **ANNIVERSARY** YEARS: THESE **ARE THE CLASSES OF** 1958, 1983, 1993 AND 2003. WE'D **APPRECIATE** YOUR HELP IN CORRECTING ERRORS AND FILLING IN THE BLANKS.



### **ALUMNI SPOTLIGHT**

Al Uebler

## Dr. Al Uebler: 30 Years of Teaching Intellectual Law to Chemical Engineers

hen E. Alan (Al) Uebler completed his Ph.D. in chemical engineering at the University of Delaware in 1966, he had no idea that he would be back 12 years later to begin a teaching stint that would continue for more than three decades.

A practicing patent attorney, Uebler has been teaching CHEG595, Intellectual Property for Scientists and Engineers, every fall since 1978. The course covers all methods of protecting intellectual property, including patents, trademarks, copyrights, and trade secrets. Uebler also discusses unfair methods of competition and analyzes significant court decisions in each area.

"The course is basically directed at innovators in all fields interested in legal protection of their ideas," Uebler says. While it is not specifically aimed at preparing future lawyers, over 50 of Uebler's former students are now patent attorneys. "I think many of them were already headed in that direction when they took my class," Uebler says modestly. "I just take heart that I didn't discourage them."

But Uebler's protégées give him far more credit than that. "Taking Al's class had a direct influence on my becoming a patent attorney myself," says Kathlyn Card Beckles, Vice President & Assistant General Counsel for J.P. Morgan Chase & Co. in New York.

Mike McGurk, a patent attorney in Cambridge, Mass., also says he owes his start in the field to Uebler. "Before I took his class, I had no idea what patent law was about," McGurk says. "Al opened my eyes to a whole new arena in which to use the technical skills I had developed in chemical engineering. I was at a point in my college career where I was not sure that I wanted



to make a full-time career out of chemical engineering, but, because of my love of science, I didn't want to completely walk away from the great education I had received at Delaware."

"In a sense, Al presented me with an option I didn't know about," he continues. "I like to think he pushed me into a career as a patent lawyer." McGurk started in the United States Patent and Trademark

Office after graduation from UD in 1983 and became an associate in 1988 at Finnegan Henderson, where he is now a partner.

Carol White also credits Uebler with helping her to choose a career path. "Through the class, Al introduced me to the world of patents and to a unique opportunity to use my chemistry degree in a challenging, non-traditional career," she says. "I entered law school the following year, and I've been fortunate to enjoy a rewarding career as a patent lawyer." White currently works for W. L. Gore & Associates.

Uebler himself went to law school the hard way—he attended night classes at the University of Maryland, commuting from Newark for four years while working full time for Gore. "Gore was very committed to patents," Uebler says, "because they're important business assets of fledgling companies, which Gore was at that time. Bill Gore himself was personally very supportive of continuing education attendance by company employees."

Uebler's background in chemical engineering and law enabled him to become involved in the early stages of the patenting process for Gore's expanded PTFE membranes, sold under the Gore-Tex trademark, and other related products. "It was interesting, exciting, and fun," he says.

Uebler had worked for the DuPont Company after earning his doctoral degree, and he returned to DuPont as a patent attorney in the company's legal department in 1977. A year later, he went into private practice, and it was through his partner that he became involved in teaching at the University.

Thirty years later, he is still doing it, and he still loves it. "Teaching is very enjoyable," he says. "It keeps me on my toes."

That feeling obviously comes through to his students. "Al brings a wealth of real- world experience and extensive knowledge of the subject to the classroom," says Mark Sprinkle, who recently left Terumo Medical Corporation to join Dentsply International. "However, his sense of humor and quick wit is what made the class fun."

Uebler's classes have ranged in size from just six students to more than thirty, and his students have ranged in age from twenty to sixty-plus. Sprinkle was a nontraditional student who returned to the classroom in his forties.

"I enrolled in Al's class for professional enrichment twenty years into my engineering career," he says. "It turned out to be one of the most practical and useful classes that I've taken, and I recommend it to anyone who will listen to me. Al's presentation of this subject challenged me to explore the world of intellectual property beyond the classroom."

Uebler is still practicing patent law, although he says he has become more selective about the projects he takes on. For him, there is nothing dull about his field. "Patent law is always changing," he says. "There have been new developments every year I've taught, and teaching forces me to keep up with them."

Although most of Uebler's students do not go on to become attorneys, they all benefit from the practical knowledge he imparts in the classroom. "One of the things that students don't realize is that employers require new hires to keep proprietary information secret," he says. "Research institutions own the ideas generated by their employees, and students don't fully appreciate that when they first walk in."

"I have close to twenty sample agreements in the course handouts," he continues, "and we talk about the various clauses and what the students can expect when they sign on with a company. It helps them to know what they're getting into. My main purpose in teaching the course is not to turn them into lawyers but to give them the tools to protect their own ideas."

Copyright law is one of Uebler's favorite topics. "My teaching of the course spans the period from the early days of the Internet through the Napster fiasco, to the present," he explains. "It's fascinating because the mentality instilled in even the top students seems to be that if something is on the web, it's free. They're shocked to find out that's not true."

One case Uebler relates in his class involves the makers of the early computer game Pac-Man versus a competing product, the lesser-known KC Munchkin game, made by Odyssey. "One of my older students actually remembered seeing the game for sale at the Newark Newsstand in the 1970s," he says. "But all of the students get a laugh out of picturing a group of appellate court judges back in their chambers playing these games, which was necessary for them to determine whether the products were 'substantially similar,' the criterion for copyright infringement."

Uebler maintains contact with many of his former students, sharing a professional and friendly relationship with them.

"Al and I stay in touch, and I hope to have an opportunity to pay him back next year and visit or teach one of his classes," says McGurk.

White adds, "In recent years, I've had the pleasure of working with AI as a colleague on a number of matters, and I continue to learn from him. I'm grateful to AI for the opportunities he opened up for me."

Sprinkle has visited Uebler's classroom to share the importance of IP from an industry perspective. "Al still lends advice if I call him," he says. "He is a true asset to the University."

Chemical Engineering Department Chair **Norm Wagner** agrees. "Al has been quietly and consistently providing an introduction to patent law for our undergraduates for 30 years, and during that time he has influenced a number of these students to pursue legal careers" he says. "That's why we decided to tell his story now—because he's way too modest to tell it himself. And as Mark Sprinkle points out, Al Uebler is truly an asset to the University of Delaware." -by Diane S. Kukich

## Engineers Without Borders: **Water is Life**

Melissa Day, Chemical Engineering Class of 2009 and Catherine Collison, Chemical Engineering Class of 2011

ver one billion people drink water from unsafe sources each day. The 3,000 villagers of Bakang, a rural village in the African country of Cameroon, are amongst those that must deal with this danger. The majority of the water sources in Bakang is turbid and contains fecal coliform bacteria, which contributes to the prevalence of waterborne diseases and the high infant mortality rate. Within its first year of operation, the University of Delaware student chapter of Engineers Without Borders (EWB) made it their mission to solve this potable water problem. A team of enthusiastic students and professionals traveled to Bakang in June 2007 to conduct an assessment of the village's water sources and health issues. In January 2008, a second site assessment team met with the village's newly formed Water Committee to discuss preliminary design ideas and sustainability. Slow sand filtration and solar powered pumps emerged as the best options to provide potable water for Bakang.

When the team got back from the assessment trip, heavy research into the theory, formation, and implementation of the two plans took place. Slow sand filtration units were designed to be placed near existing hand dug wells to purify current water sources. These filters are simple concrete containers holding layers of sand and gravel that serve to eliminate waterborne pathogens and impurities. All required materials are readily available within a few miles of Bakang, and during the implementation trip in June 2008, the team worked with a local church's trade school to instill local manufacture of the reusable concrete molds. Lessons regarding water quality and filter maintenance were also given. The villagers quickly developed the ability to make their own filters, even upgrading the design with new elements. This supports the EWB hope that production will continue until each household has one. The help of local Peace Corps volunteers, medical students, and sanitation workers have helped the team communicate with the villagers to continue to facilitate the exchange of technical knowledge.

The first step towards a solar-powered well and distri-



bution system was also implemented this past June. With the help of several members of the community, an old borehole well hand pump was retrofit for a solarpowered submersible pump connected to solar panels and storage tanks. Unfortunately, even at maximum power this well can provide only enough water for less than half the community. Multiple wells are needed, but additional boreholes are currently outside EWB's financial capabilities. Dauntless commitment and a desire to use engineering concepts to help those around the world keep the organization running at high pace, however. By increasing the quantity, quality, and accessibility of water in Bakang, the students in EWB have improved not only the quality of village life, but their understanding of the world as well.

For more information please visit <u>http://copland.udel.edu/stu-org/ewb/index.html</u> or email <u>ewb.udel@gmail.com.</u>



## Teaching the Teachers of Tomorrow

The teaching fellow program is designed to give senior level graduate students a closely supervised in-class teaching experience. Since its inception in 1993, we have appointed and supervised over 30 fellows. Ten of them have gone on to teaching positions at a variety of universities. This teaching experience has not only been valuable for the participants but those who participate in the informal discussions with the fellows also gain and contribute to the teaching program. The fellows have also been critical to the development of new material for the undergraduate courses; an example is the text, *Mass and Heat Transfer*, described in this newsletter. The teaching fellows program is supported by departmental gift funds and an endowed Fraser and Shirley Russell Teaching Fellow gift.



**Mary McDonald**, PhD candidate, writes the following about her experience as the Fraser and Shirley Russell Teaching Fellow: I was honored to be the Fraser and Shirley Russell Teaching Fellowship recipient in 2007-2008. Delaware has an extensive history and reputation of producing strong chemical engineering

graduates, both at the undergraduate and graduate level, but part of what truly sets the University of Delaware Chemical Engineering department apart is the variety of opportunities for each student to shape and prepare for his or her own unique future. One such opportunity is the Fraser and Shirley Russell Teaching Fellowship. Engineering graduate students who are interested in a career in academia often have very little, if any, true teaching experience, yet teaching undergraduate courses is a primary responsibility for faculty members. Dr. T.W. Fraser Russell saw an opportunity to prepare Delaware graduate students interested in academia for this challenge, and after his wife passed away he endowed a fellowship in her memory to help give graduate students an opportunity to participate in teaching an undergraduate course.

I was fortunate to receive the Fraser and Shirley Russell Teaching Fellowship to co-instruct CHEG112: *Introduction to Chemical Engineering*, and I have never learned so much from an introductory course. I built a much greater appreciation for and understanding of the discipline of chemical engineering. In doing so, I discovered holes in my own knowledge that I was able to fill in and build upon throughout this experience. I learned about myself and challenged myself to learn from every mistake (and there were mistakes, and thus many learning opportunities). But perhaps the most valuable lesson that I learned is how to define my own teaching style. The input and feedback I received from Dr. Russell and the co-instructors in CHEG112 helped me to determine which of my teaching techniques were most effective and how to refine my lectures to optimize my effectiveness in teaching the material. Each instructor has a unique teaching style, and I very much appreciated this opportunity to begin to discover mine. I am extremely grateful for this opportunity, and I feel as though this was an invaluable experience that reinforced my passion for teaching and one that will also help me to be a much better instructor throughout my career.

Although I never had the fortune to meet her myself, I believe that Shirley Russell would be very proud of this program, and I am very honored to have been a part. I believe that teachers shape the future by challenging the minds of subsequent generations, and I hope that I can take the many lessons that I learned throughout this experience with me into my classroom to teach and inspire future engineers as I have been taught and inspired by my teachers. Thank you to my co-instructors in CHEG112, my advisors, and especially Dr. Russell for being great teachers to me throughout this remarkable opportunity.



**Carissa Young**, PhD candidate, writes the following about her experience as a Teaching Fellow: I was honored to be awarded one of our department's 2007-2008 teaching fellowships. Prior to my first lecture, I believed that my years of experience teaching in the public educational system had prepared me for any foreseeable

event. In many ways, this notion proved accurate – to engage your audience by using examples to which the students can relate, recognizing that simplicity is best. Under the guidance of Professor Babatunde Ogunnaike, I was presented with the opportunity to teach a module of *Probability and Statistics: Problem Solving for Engineers and Scientists* to graduate and undergraduate students in various departments. I enjoyed the interactions with students and colleagues, as well as the personal incentive to learn course material in-depth, beyond my previous basic understanding. This fellowship has been a rewarding experience, which has fostered a deeper respect for those that have accepted the challenge to teach at the university level.



### **FACULTY NEWS**

#### **Three New Faculty Joined ChE in 2007**

n our last Alumni Newsletter, we announced our three new faculty members. This year, see what they are doing.



**Maciek Antoniewicz** earned his BS in Chemical Engineering in 1998 from Delft University of Technology, his MS in Chemical Engineering in 2000 from Delft University of Technology, and his PhD in Chemical Engineering in 2006 from Massachusetts Institute of Technology where he received the DuPont-MIT Fellowship from 2001-2006. He joined our department September

1, 2007 after serving as a postdoctoral scientist with Du-Pont in Central Research and Development.

**Maciek Antoniewicz**, assistant professor, was recently honored by the DuPont Co. as one of 17 young professors from universities in the United States, China, Spain and India with the annual DuPont Young Professor Grant for original research. This innovative grant program is designed to provide start-up assistance to promising young and untenured research faculty working in areas aligned with DuPont's strategic business growth. Antoniewicz will receive a grant of \$25,000 per year for three years. The grant may be used to obtain matching funds through the National Science Foundation or other organizations. His research interests include metabolic engineering and systems biology and engineering microbial cells for production of biofuels and biochemicals.

**Maciek** also received a University of Delaware Research Foundation (UDRF) Research Award of \$25,000 for his research proposal entitled "Application of tandem mass spectrometry for quantifying labeling distributions and estimating metabolic fluxes."



Kelvin H. Lee, Gore Professor, who joined our faculty September 1, 2007, comes to us from Cornell University where he served as the Samuel C. and Nancy M. Fleming Professor of Molecular and Cell Biology in the School of Chemical and Bimolecular Engineering, and as director of the Institute for Biotechnology and Life Science Technologies and also of the New York

State Center for Life Science Enterprise.

His research focuses on gene-expression-monitoring

tools, such as mass spectrometry, for measuring protein expression relevant to the pharmaceutical and chemical industries and to human health, including studies on diagnosing Alzheimer's disease.

His research has received funding from the National Science Foundation, the National Institutes and other organizations.

He has published extensively in his field and has a patent issued to California Institute of Technology and three other patents filed or pending.

Among his honors, Lee has served as Distinguished Professor of the New York State Office of Science, Technology and Academic Research; received the Cornell provost's Ronay and Richard Menschel Award for Distinguished Scholarship; won a National Science Foundation CAREER award; was named by the *MIT Technology Review* as one of the top 100 innovators in the world in business and technology; and has received teaching and other awards. He was an invited participant in the National Academy of Engineering Frontiers of Engineering Symposium in 2003.

A graduate of Princeton University, Lee received his master's and doctoral degrees from the California Institute of Technology and also studied at the Institute of Biotechnology of the Swiss Federal Institute of Technology.

UD Professor Seeks Alzheimer's Tool and Treat-

ment. Alzheimer's disease (AD), the most prevalent form of dementia, affects some 4 million people in the United States. It is the third most costly disease, after cancer and cardiovascular disease. And not only is there no cure for Alzheimer's; there is no accurate pre-mortem diagnostic tool. Only an autopsy can indicate for sure that a patient had the disease. Kelvin H. Lee, Gore Professor and Delaware Biotechnology Institute (DBI) Director, is hoping that the work he and his research group are doing will contribute to the development of both an accurate diagnostic tool for Alzheimer's and a strategy that will protect against the ravages of the disease. His vision is grand--he would like to contribute to the development of a tool like the medical "tricorder" seen in Star Trek. The handheld device could scan the body, interpret and display data from the scans, and record information, helping doctors to diagnose disease. Given the rapid development of proteomics, the largescale study of the structure and functions of proteins, Lee's vision may not be as far-fetched as it seems. "We're looking for changes in protein expression in cerebrospinal fluid," he explains, "and trying to come up with a 'bar code' that can distinguish between patients who have AD and those who don't, as well as between people

with AD and those with other, similar diseases that can cause dementia." Doctors can currently diagnose living patients only as "probable AD" because it takes a postmortem examination of brain tissue to provide definitive evidence of the amyloid plaques that characterize Alzheimer's. Lee points out that an estimated 10-20 percent of people with this diagnosis are found to have other conditions that manifest similar symptoms. "We need a tool that's specific enough to distinguish among neurodegenerative diseases so that the proper treatment can be administered," he says. As a postdoc at Caltech, Lee had worked with a research group that was studying Creutzfeldt-Jakob disease (CJD), a rare and incurable brain disorder that, like Alzheimer's, can be diagnosed only post-mortem through an examination of brain tissue. CJD is classified as a transmissible spongiform encephalopathy, a term used to designate a group of disorders that also includes mad cow disease. Using a special technology to measure "protein fingerprints" in cerebrospinal fluid, the researchers found that there was a change in one particular protein in people who had CJD.

The project provided a proof of principle that protein fingerprints could be used as a tool to diagnose neurodegenerative disease, but when Lee accepted a faculty position at Cornell in 1997, he wanted to shift his focus. "Mad cow was biologically interesting and was making headlines at the time because of an outbreak in England," he says, "but it's not a disease that affects a lot of people." So Lee decided to focus on Alzheimer's. Working with Dr. Norman Relkin, a physician at the Cornell Medical Center in New York City who was doing both clinical and laboratory work on the disease, Lee received funding from the National Institutes of Health for a study aimed at finding biomarkers for the disease--in effect, a protein barcode unique to those with Alzheimer's. The results of the study yielded a set of validated biomarkers for Alzheimer's, which was published in the Annals of Neurology in late 2006. In the meantime, the research group had turned its attention from diagnosis to treatment. "There has never been a good treatment for Alzheimer's," Lee says. "Most therapies treat the symptoms to improve quality of life for six months or so. At the end of that period, many patients are not any better off than untreated patients. "My collaborators began to wonder whether people could be immunized against AD," Lee continues. "The disease is characterized by the formation of amyloid plaques in the brain. Would it be possible to get the body to form antibodies to clear the damaging plagues when they're formed?" Relkin and colleagues from Cornell conducted a Phase I study in which they administered intravenous immunoglobulin (IVIg) to Alzheimer's patients. "The

drug was already FDA approved for treating certain people with compromised immune systems," Lee says. He explains that IVIg is basically a cocktail of antibodies taken from a pool of healthy donors. "It turns out that we normally produce antibodies to the protein that is a hallmark of Alzheimer's," Lee says. The Phase I study design involved six months of treatment with the drug, followed by three months of no treatment, referred to as drug washout. "Cognitive ability improved during the treatment period and then reverted during drug washout," Lee says, "suggesting that cognitive losses were actually reversed by the therapy. This was a very encouraging outcome despite the fact that it was preliminary and involved a very small number of subjects. As a result, all of the subjects were put back on the drug, which resulted in positive effects in patients even after 18 months." Lee points out that the Alzheimer's research conducted by his team began in one direction and has changed over time. The initial effort, which has basically been accomplished, was to identify diagnostic markers for Alzheimer's and to determine what happens to the markers as patients are treated. "We found that there are markers and that they mirror the clinical results," Lee says. "In other words, improvement in patients' cognitive functioning seemed to correlate with a reduction of the markers in their cerebrospinal fluid." The next steps for the team include conducting additional clinical trials and moving towards obtaining FDA approval to treat Alzheimer's patients with IVIg. "To facilitate this, we would like evidence that the clinical outcomes observed are derived from measurable molecular changes," Lee explains. "We want to demonstrate, at the molecular level, the disease-modifying effects of the drug." Lee is still collaborating with his Cornell colleagues to collect data that will validate the link between the disease-modifying effects of the drug and the observed clinical outcomes. He said he hopes that their work will lead not only to a noninvasive diagnostic tool and an effective treatment but also an understanding of the mechanisms underlying the development of the disease. "It would be ideal to have that medical tricorder," he says. "But we're not there yet. -bv Diane S. Kukich

**Kelvin Lee** was on WHYY TV, Health and Medical feature, on May 20, 2008. They interviewed him about the progress of his Alzheimer's research.

**Kelvin H. Lee**, Gore Professor, presented his inaugural lecture, "*Engineering Works in More Places Like BioTech-noNanoOmics*" on Tuesday, April 29, 2008. The Gore Professorship honors the Gore family, including Robert W. Gore '59, Sarah I. Gore '76M and the late Genevieve W. Gore. Robert W. Gore, a chemical engineering graduate

### FACULTY NEWS

of the University of Delaware, served as president of W. L. Gore and Associates, Inc. and is a member of the UD Board of Trustees. In 1990, Dr. Gore received the College of Engineering Distinguished Alumni Award and he was inducted into UD's Alumni Wall of Fame in 1992.



**Eleftherios T. Papoutsakis (Terry)**, Eugene du Pont Chair of Chemical Engineering and Delaware Biotechnology Institute (DBI) Faculty Fellow, who joined our faculty July 1, 2007, comes to us from Northwestern University, where he served as Walter P. Murphy Professor of Chemical and Biological Engineering and also was a member of the Lurie Comprehensive Cancer Center

of the Northwestern University Medical School. Before that, he was a member of the Rice University faculty.

His research focuses on areas of systems biology, metabolic engineering, experimental and computational genomics with applications in stem-cell biology and prokaryotic biology for the production of biofuels and chemicals from biomass.

A fellow of the American Academy of Microbiology and the American Association for the Advancement of Science and a founding fellow of the American Institute of Medical and Biological Engineers, Papoutsakis also has received several awards, including the Amgen Biochemical Engineering Award and the Merck Cell Culture Engineering Award, both from the from Engineering Conferences International; the Alpha Chi Sigma Award and the Food, Pharmaceutical and Bioengineering Award, both from the American Institute of Chemical Engineers; and the Marvin Johnson Award and the Van Lanen Award, both from the Biochemical Technology Division of the American Chemical Society.

**Papoutsakis** has published extensively in his field and served as editor-in-chief of *Biotechnology and Bioengineering*. He also holds three patents.

A graduate of the National Technical University of Athens, Papoutsakis received his master's and doctoral degrees from Purdue University.

**E. Terry Papoutsakis**, Eugene du Pont Chair of Chemical Engineering, presented his inaugural lecture, *"Of Megakaryocytes & Platelets"*, on Wednesday, April 16, 2008. This professorship honors Eugene du Pont (1840-1902), a native Delawarean, who served as fourth president of the DuPont Company from 1889-1902. The Eugene du Pont Distinguished Memorial Scholarship program for highly qualified, incoming freshmen is also named in his honor. We are proud to announce that **Mark A. Barteau**, Robert L. Pigford Chair of Chemical Engineering and former chairperson of the Department is now the Senior Vice Provost for Research and Strategic Initiatives. *Congratulations Mark!* 

### OFFICE OF RESEARCH AND GRADUATE STUDIES TO BE REORGANIZED



he University's Office of Research and Graduate Studies will be reorganized in keeping with the recommendation of the Strategic Planning Committee, Provost Dan Rich announced.

The committee's report to President Patrick Harker included the recommendation that a position of vice

provost for graduate studies be created "to provide support, oversight and vision and to eliminate administrative barriers to multidisciplinary education and research."

Under the new organization, which was effective July 1:

• Mark Barteau, Robert L. Pigford Chair of Chemical Engineering, will become senior vice provost for research and strategic initiatives; and

• Debra Hess Norris, Henry Francis du Pont Chair in Fine Arts and associate dean in the College of Arts and Sciences, will become vice provost for graduate and professional education.

"These talented individuals have already contributed much to this University, and I am very pleased that they have each agreed to take on new assignments that will help mobilize the University on its path to prominence<sup>™</sup>," Harker said. "It is particularly appropriate that **Mark Barteau** and Debra Hess Norris, who co-chaired the Strategic Planning Committee and worked so hard on shaping the vision for this institution's future, are now taking key roles in making it happen."

"Mark Barteau is one of the University's most accomplished faculty members and academic leaders. He brings an impressive record of accomplishments to his new assignment," Rich said. "In addition to overseeing the operation of the research office, he will be working closely with me, President Harker, the deans and faculty members to develop and strengthen strategic research initiatives, particularly interdisciplinary, cross-college programs in such areas as energy, the environment, life and health sciences, and biotechnology."

In his new post as senior vice provost for research and strategic initiatives, Barteau also will be working closely with Harker to establish global research collaborations and partnerships and to achieve high visibility for the University's research and multidisciplinary scholarship nationally and internationally.

Barteau said, "The first initiative in the strategic plan addresses the need to take research to a level never before seen at the University of Delaware. I am very excited by the opportunity to play a leadership role in this effort."

#### For the complete article, please see: <u>www.udel.edu/PR/</u> <u>UDaily/2008/may/changes050608.html</u>.

In last year's newsletter, we announced that President Harker asked **Mark Barteau** to co-chair the Strategic Planning Committee. Mark also agreed to organize, coordinate and lead the Energy Institute. Below are several condensed articles that will update you on these initiatives.

#### Symposium fuels new ideas for future UD energy research



Mark Barteau, the Robert L. Pigford Chair of Chemical Engineering at UD: "Energy is, as the National Academy of Engineering declared, one of the grand challenges of our time. And you can't look at the problem through any single prism to solve it."

rom a hydrogen fuel cell-powered bus to a solar-powered poultry house, the University of Delaware has a number of clean, green, "on the ground" initiatives under way in energy research and policy. But there's room for much more. That was the conclusion of a panel of UD experts assembled at a campus-wide symposium held March 17 at Clayton Hall Conference Center.

The event was designed to bring UD researchers together to share information on current projects and to spark potential collaborations that might be advanced by a new energy institute slated for development at UD. More than 170 participants, including UD students, faculty and staff, as well as representatives from government and industry heard lectures and discussion from local experts, and learned from more than 30 student poster presentations. **Mark Barteau**, the Robert L. Pigford Chair of Chemical Engineering, coordinated the symposium, which was supported by the Unidel Foundation.

Leading off the symposium, Barteau, a member of the National Academy of Engineering and a participant in the recent Summit on America's Energy Future in Washington, D.C., quoted sobering statistics about the nation's energy future.

"Energy is, as the National Academy of Engineering declared, one of the grand challenges of our time," Barteau said. "And you can't look at the problem through any single prism to solve it," he noted. "It's much more complex than that."

World energy consumption has reached 400 quads per year, or 13.5 terrawatts. The United States uses about one quarter of that total. The majority of the petroleum we use is for transportation (more than 60 percent is imported), while coal-fired plants supply the largest portion of our electricity.

As world population grows, a tripling of energy use is predicted by the end of this century, with the additional challenge to decrease carbon dioxide emissions from current levels.

According to Barteau, a whopping 40-fold increase over today's renewable energy production would be required to meet those future needs.

"However, no single energy source or technology will solve our energy needs," he noted, adding that energy conservation and efficiency also are key. "Technology change is not enough--policy change is also essential."

For the complete article, please see: <u>www.udel.edu/PR/</u><u>UDaily/2008/mar/energy032808.html</u>.

Additional information about energy research at the University of Delaware, including downloadable files of the symposium presentations, can be found at <u>www.</u> <u>energy.udel.edu</u>.

Note that the formal inauguration of the University of Delaware Energy Institute was held on September 19, 2008. See: <u>www.udel.edu/energyinstitute/</u> for details.

**Mark Barteau** was also named one of the "One Hundred Engineers of the Modern Era", which will be featured in the October issue of CEP.

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### **FACULTY NEWS**



**Eric Kaler** is now Provost and Senior Vice President for Academic Affairs at Stony Brook. We wish Eric Kaler all the best in his new career as Provost and Senior Vice President for Academic Affairs at

Stony Brook University. Eric, former Dean and Elizabeth Inez Kelley Professor of Chemical Engineering, is world recognized for his research on surfactant science and self assembly. Eric has been a valuable member of our department since 1989 and has chaired the Department from 1996-2000. He has served as dean of the College of Engineering since 2000. During his tenure, the number of female faculty increased from four to 15, making it now one of most gender diverse engineering research colleges in the country, and enrollment grew from 900 to 1,200 undergraduate students. Research funding nearly doubled to almost \$50 million annually, and he also raised substantial private funds for facilities, equipment and endowed positions in the college. He has over 200 publications and 6000 citations and has been recognized by many national awards. He received his undergraduate degree from California Institute of Technology in 1978, and his Ph.D. from the University of Minnesota in 1982.

### We congratulate our valued colleague and wish him well in his new career!

Antony Beris was invited to participate May 19-June 20, 2008 in Nanoscale Interfacial Phenomena in Complex Fluids at the newly established Kavli Institute of Theoretical Physics by the Chinese Academy of Sciences and the Kavli Foundation established by the philanthropist Fred Kavli, the same one that established also the Kavli awards (aimed to be equivalent to Nobel prices). The first ones were announced at the end of May in Norway. Antony participated in the workshop as well as offered a series of tutorials on nonequilibrium thermodynamics and its applications for complex surfaces and interfaces. More information can be found at: www.kitpc.ac.cn/Activities/program/programtalks.aspx?id=55957654.

**Doug Buttrey** was on sabbatical from September 1, 2007 – August 31, 2008, visiting several universities. He was a visiting professor in the NanoCenter at the University of South Carolina in Columbia for three months in the fall, working with Professors Tom Vogt (NanoCenter Director) and Doug Blom (USC Electron Microscopy Facility) on a variety of applications of aberration-corrected scanning transmission electron microscopy (STEM). In December, he participated in the 75<sup>th</sup> birthday celebration for Professor Sir John Meurig Thomas at Cambridge University in the UK. From January through early April he was a visiting professor in the Catalysis Research Center (CRC) at Hokkaido University in Sapporo, Japan, working with Professor Wataru Ueda (CRC Director). In May, he visited the Adam Mitskevich University and participated in the Symposium on Group Five Elements there. In July and August, he was a visiting professor at the new African University of Science and Technology in Abuja, Nigeria (AUST-Abuja), organized by the Nelson Mandela Institution, where he taught a condensed graduate course in thermodynamics. (See Department News)



**Jingguang Chen** received the 2008 Excellence in Catalysis Award from the Catalysis Society of Metropolitan New York. He received a plaque and a cash gift at the society's awards ceremony on May 21 in Somerset, NJ, where he presented an Excellence in Catalysis Award lecture.

**Jingguang Chen** was appointed the Claire D. LeClaire Professor of Chemical Engineering effective January 1, 2008. Dr. Chen has made significant research and contributions to the areas of catalysis and materials science, and has also made exceptional contributions to the mission of the Chemical Engineering Department. He has pioneered and further developed important areas of chemical engineering related to the rational design of carbide and bimetallic catalysts with desirable catalytic activity and selectivity, as well as work in the utilization of Near-Edge X-ray Absorption Fine Structure (NEXAFS) to characterize the catalytic properties of transition metal compounds.

**Jingguang Chen** was named a Fellow of AVS (American Vacuum Society). This fellowship recognizes members who have made sustained and outstanding technical contributions in areas of interest to AVS.



**Thomas H. Epps III**, assistant professor, is among 82 of the nation's brightest young engineers selected to attend the National Academy of Engineering's (NAE) 14<sup>th</sup> annual United States Frontiers of Engineering symposium, set to run this year from September 18-20 in Albuquerque, NM. Epps was nominated to attend the symposium by **T.W. Fraser Rus**-

**sell**, A.P. Colburn Professor of Chemical Engineering, said that the opportunity will give him a chance both to interact with fellow engineers from different fields

and learn from experts invited to lecture at the event. Epps said that he believes he was selected for the honor because of strides he has made in his own field of specialty, block copolymer systems, and also because of the leadership role he has taken in the National Science Foundation-sponsored Research Experiences for Undergraduates (REU) program that takes place at UD each summer. Norman Wagner, Chairperson and the Alvin B. and Julia O. Stiles Professor, said that the honor of Epps being selected by the NAE to attend the symposium speaks for the caliber of his scholarship, both in and out of the classroom. He added the selection of Epps for such a prestigious honor is an asset to the department, as well as to the University. The two-and-ahalf-day event will bring together engineers ages 30-45 who have come to the notice of the NAE for performing exceptional engineering research and technical work in a variety of disciplines. The participants, who work in academia, government and corporate industries, were nominated by fellow engineers or organizations and were chosen from more than 230 applicants.

**Epps** also is the co-principal investigator with **Jochen Lauterbach** on a new, three-year, NSF Research Experiences for Undergraduates (REU) grant, which will enable 10 exemplary students per year in chemical engineering to work with UD researchers over the summer on such projects as the design of new fuel cells, to the engineering of novel nano-material coatings to reduce the drag on ships in water.

**Thomas Epps III** was an invited lecturer for the Frontiers in Functional Polymers, a symposium in honor of Professor S. D. Worley, held April 30, 2008. His talk was entitled "*Block Copolymers: A Feasible Route to Generating Functional Nano-materials*". This research symposium was sponsored by the College of Sciences and Mathematics at Auburn University.

**Eric Furst** was appointed Director of the Center for Molecular and Engineering Thermodynamics (CMET), succeeding **Stanley Sandler**, who founded the center. Established in the Spring of 1992 as a research unit within the Department of Chemical Engineering, CMET serves as a focal point for stimulating collaborative experimental and theoretical research and encouraging the development of new educational materials in all areas of thermodynamics.



Jochen Lauterbach, professor, represented the United States on a scientific panel focusing on the impact of catalysis on energy and the environment at the G8 Summit, July 7-9, in Toyako, Japan. Held annually since 1975, the G8 summit brings together the leaders of the "group of eight" (G8) countries--including Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and

the United States--to discuss major economic and social issues facing the global community and to reach a consensus on measures to address them. The European Union also participates in the summit and is represented by the president of the European Commission. The agenda for this year's summit included such issues as the environment and climate change, development and Africa, sustained growth of the world economy, protection of intellectual property rights, terrorism and nonproliferation of weapons of mass destruction. Lauterbach is a member of a panel of experts who addressed the impact of catalysis on current energy and environmental issues facing the world. The panel, which includes experts from G8 nations, as well as representatives from non-G8 countries, made recommendations to the G8 members about future research to address energy needs. In research at UD's Center for Catalytic Science and Technology, Lauterbach and his students recently discovered a novel formulation for operating pollution-abating catalytic converters that is much less expensive than present catalysts composed of noble metals. Currently, Lauterbach is involved in several major research efforts including UD's Sustainable Energy from Solar Hydrogen program, which is sponsored by the National Science Foundation's Integrative Graduate Education and Research Training (IGERT) program, and a U.S. Department of Energy project to identify low-cost, nano-sized catalysts--tiny amounts of metal compounds--that can spur the chemical conversion of liquid fuels such as ammonia into hydrogen for fuel cells that can be used to power cars and homes. Lauterbach also is the co-principal investigator with **Thomas Epps III** on a new, three-year, NSF Research Experiences for Undergraduates (REU) grant.

**Professor Lauterbach** was one of several prominent UD faculty who spoke at the Symposium on New Nobel Laureates in October, 2007. His talk was about his doctoral adviser, Gerhard Ertl, who won the 2007 Nobel Prize in chemistry for his studies of chemical processes on solid surfaces.

### FACULTY NEWS



**Babatunde Ogunnaike**, the William L. Friend Professor, was awarded the 2008 American Automatic Control Council's Control Engineering Practice Award. The award, given to one person or one team for significant contributions to the advancement of control practice, was presented at the American Automatic Control Council conference in Seattle in June. Ogun-

naike and his research group work to understand the behavior of complex systems using math and analysis, then in turn, use this understanding for designs and improved controls.

Babatunde A. Ogunnaike was honored with ISA's Donald P. Eckman Education Award at the organization's gala held Oct. 1 in Houston. ISA, based in Research Triangle Park in North Carolina, is a leading international organization that sets standards for automation and helps professionals solve difficult technical problems. Ogunnaike received the award for his outstanding contributions to education and training in the science, engineering and technology of instrumentation, systems and automation. His contributions in education and training in instrumentation and process control through books, book chapters, papers, college courses, industry short courses and workshops over the past 25 years have had a profound impact on the development of thousands of engineers and industrial practitioners. Ogunnaike's success as a teacher and a trainer is a result of his extensive education, plus years of experience applying the methods he teaches through research and engineering positions at DuPont and the Shell Development Company. Ogunnaike has developed and taught more than 17 courses, including several graduate courses, at UD, where he also serves as a professor in the Center for Systems Biology at the Delaware Biotechnology Institute. He developed and taught many short courses on process dynamics and control at DuPont and at the annual DuPont TECHCON. Ogunnaike has written numerous books and more than 75 papers and book chapters, and served as associate editor of the Institute of Electrical and Electronics Engineers' IEEE Transactions on Control Systems Technology and the American Chemical Society's Industrial & Engineering Chemistry Research. He has delivered more than 90 seminars at universities, conferences, symposia and companies and his textbooks have been used to educate and train thousands of engineers in instrumentation, systems and control at more than 29

universities. "It's more important today than ever before that we honor the people who make a difference in our industry," Steve Huffman, ISA president, said. "The gala gives us an opportunity to recognize the excellence of automation professionals from around the world."

In July and August, **Tunde Ogunnaike** was a visiting professor at the new African University of Science and Technology in Abuja, Nigeria (AUST-Abuja), organized by the Nelson Mandela Institution, where he taught a condensed graduate course in thermodynamics. (See Department News)

**Christopher J. Roberts**, Assistant Professor, received the College of Engineering Excellence in Teaching Award. The recipient is selected by our students and is awarded at Honors Day.

**Anne S. Robinson** was promoted to full professor effective September 1, 2008. Congratulations to Anne! Anne is the first woman in the history of the college to be promoted to full starting as an assistant professor at UD.

**Anne Robinson** was also on sabbatical from September 1, 2007 – August 31, 2008 at the University of California-Santa Barbara. Anne worked with Professors Francis J. Doyle, III (Chemical Engineering) and Kenneth Kosik (Neuroscience Research Institute). Her NIH-supported research fellowship focused on examining the pathology of tau, a microtubule-associated protein present in neuronal cells that has been associated with Alzheimer's disease and several other tau-related dementias.

**Stanley Sandler**, H.B. duPont Chair of Chemical Engineering, has been named one of the *"Thirty Authors of Groundbreaking Chemical Engineering Books"* by AIChE's Centennial Celebration Committee to recognize his contribution to the profession and society.

**Stan Sandler** is an Honorary Professorial Fellow, University of Melbourne, Australia, from 2004 until 2009. He is also an ExxonMobil Professor, National University of Singapore from 2006 until 2009.

illicent Sullivan, assistant professor, is UD's latest recipient of the National Science Foundation's prestigious Faculty Early Career Development Award. The highly competitive award is bestowed on those scientists and engineers deemed most likely to become the academic leaders of the 21<sup>st</sup> century. The five-year, \$489,798 grant will support Sullivan's research to determine how cells interact with potential drug carriers and how the resulting structural changes of the carrier affect its ability to efficiently deliver its payload. Sullivan wants to harness the cell's biological environment to "productively evolve" new drug or gene packaging materials as they make the rough-and-tumble journey from a blood vessel, through the connective tissue, through the cell membrane, and finally into the nucleus or other organelle within a target cell where the package will open up to deliver its contents. Currently, Sullivan is working to design synthetic DNA delivery materials that mimic elements of the architecture and function of histones in chromosomal DNA packaging. Sullivan is creating gold nanoparticles functionalized with histone tail sequences strongly associated with transcriptional activity. When used for packaging therapeutic DNA, these materials will protect and direct their payloads during extra- and intracellular transport. Once they are exposed to the specific chemical cues within the cell's nucleus, the materials are pre-programmed to "trigger," resulting in the partial release and activation of the cargo DNA. Confocal fluorescence microscopy and cryotransmission electron microscopy will be used to investigate what happens to the materials once they are introduced to cells, and to determine if they do, indeed, "loosen up" and affect DNA transcription, Sullivan said. The educational component to the research project is designed to expose students to engineering before they reach college. As part of the UD College of Engineering's Research Experiences for Teachers program, Sullivan is ready to pilot teacher internships aimed at developing course modules in bioengineering for the high-school curriculum. Two high-school teachers--including one science teacher and one math teacher--and an in-service teacher in mathematics education spent six weeks doing research in Sullivan's lab this past summer. Their work included both an experimental component and a modeling component to give each teacher a lead role in his or her area of expertise. Additionally, teaching assistantships were offered to high-school students who worked alongside the teachers in the lab and did the full experiments. The students were comentored by UD undergraduate and graduate students.

Millie Sullivan has been appointed as the Merck



Faculty Fellow for 2008. The purpose of the Merck Faculty Fellowship is to recognize a young faculty member who displays exceptional promise and to enhance the faculty fellow's research and professional development.

**Millie Sullivan** was featured on several web sites, including Nanowerk, FirstScience and Genetic Engineering News, after the announcement that she had received a National Science Foundation Faculty Early Career Development Award for her research on therapeutic drug carriers.

**Dion Vlachos** was the George Piercy Distinguished Visiting Professor, Chemical Engineering and Materials Sci-



ence Department, University of Minnesota, Fall 2007. Also, in January 2008, Dion Vlachos was appointed the Director of the Center for Catalytic Science and Technology (CCST).

**Norman Wagner**, Alvin B. and Julia O. Stiles Professor and Department Chairperson, is principal investigator for the new UD Center for Neutron Science. UD has won a competitive award of more than \$7 million over a fiveyear period from the National Institute of Standards and Technology (NIST), and will use it to develop the next generation of neutron scattering instrumentation through the creation of this center. UD won the award as part of an open competition sponsored by the NIST's National Center for Neutron Research (NCNR). This new center will explore and develop new areas of neutron scattering science, with emphasis on strengths in complex fluids, macromolecular science and condensed matter physics.



Small Angle Neutron Scattering pattern from a flowing self-assembled surfactant system. The pattern indicates the molecular assembly and how the assembled structure aligns with the flow direction. The results are being used to engineer better surfactant systems for health care applications.

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Co-principal investigators are **Thomas H. Epps III**, assistant professor of chemical engineering; **Raul Lobo**, professor of chemical engineering; **Kristi Kiick**, associate professor of materials science engineering; and **Darrin Pochan**, professor of materials science engineering. Also involved in the project is **Millicent Sullivan**, assistant professor of chemical engineering.

**Norman Wagner** was invited to present The Dale Pearson Lectureship in Chemical Engineering at the University of California, Santa Barbara on May 13 and 14, 2008. His talk on May 13 was titled "The Rheology of Colloidal & Nanoparticle Dispersions: "STF Armor" – Nanoparticle Composites for Flexible Ballistic Materials". His talk on May 14 was titled "A Tale of Two Surfactants: Structure and Rheology of Shear-banding Wormlike Micellar Solttions".

### **FACULTY NEWS**

**Norman Wagner** was elected as a Member-At-Large of the Executive Committee of The Society of Rheology for 2007-2009, and Chair of the Gordon Research Conference on Colloids and Polyelectrolytes (2012).

**Richard Wool** was invited to give the plenary address at the Fiber Reinforced Composites meeting this past December in Port Elizabeth, South Africa. His title was *"Advanced Bio-based Polymers and Composites"*. Richard was also elected to be Chair of the Gordon Research conference on Composites (2012).



**Richard Wool** was quoted in a March 9 Norfolk Virginian-Pilot article, "The Flap Over Plastic Shopping Bags", about paper versus plastic shopping bags.

In June 2008, Professor Richard Wool was featured on the Sundance channel on *"THE GREEN: Big Ideas for a Small Plant"*. In this episode, Richard looks towards the future with chicken

feathers and soybeans, in hopes of creating all natural circuit boards. For more information on this and the Sundance channel, go to: <a href="https://www.sundancechannel.com/thegreen/#/bigldeas:landing">www.sundancechannel.com/thegreen/#/bigldeas:landing</a>

#### "BREAKING NEWS: Kelvin Lee Appointed New Director of DBI"



**Kelvin Lee**, Gore Professor of Chemical Engineering and Delaware Biotechnology Institute Faculty Fellow, has been appointed the new director of the Delaware Biotechnology Institute, effective Sept. 1.

Lee replaces David Weir, who had directed DBI since its inception in 1998 until this year, when he was named director of the University's new Office of Economic Innovation and Partnerships.

As director of DBI, Lee will lead an organization developed as a center of excellence in biotechnology and the

life sciences through a partnership of government, academia and industry.

The mission of DBI is to facilitate a biotechnology network of people and facilities to enhance existing academic and private sector research, catalyze unique cross-disciplinary research and education initiatives, and to foster the entrepreneurship that creates high-quality jobs.

Lee joined Chemical Engineering in 2007 from Cornell University, where he served as the Samuel C. and Nancy M. Fleming Professor of Molecular and Cell Biology and Professor in the School of Chemical and Biomolecular Engineering, and as director of the Institute for Biotechnology and Life Science Technologies and also of the New York State Center for Life Science Enterprise.

### SAVE THE DATE AUGUST 24, 2009



John M. Clayton Hall T.W. FRASER RUSSELL SYMPOSIUM CELEBRATING 50 YEARS OF SERVICE

www.che.udel.edu/twfr.htm

**Michael Chajes**, who has served as interim dean of the College of Engineering since last October, has



been named dean of the college after a national search. His appointment became effective July 1. Chajes was named interim dean of the college last year, when the previous dean, **Eric Kaler**, resigned to become provost and senior vice president for academic affairs at Stony Brook University. A graduate of the University of Mas-

sachusetts at Amherst, Chajes completed his master's and doctoral degrees at the University of California at Davis, where he was twice awarded that university's outstanding graduate student teaching award. Chajes joined UD's faculty in 1990 as an assistant professor of civil and environmental engineering. He was promoted to associate professor in 1996 and to professor in 2002. He served as acting associate chairperson in 1996 and as associate chairperson from 1998-2001. In 2001, Chajes was appointed chairperson of the Department of Civil and Environmental Engineering.

Two University of Delaware professors taught courses at the African University of Science and Technology



(AUST) in Abuja, Nigeria, this past summer. **Douglas Buttrey**, professor, taught a course in engineering thermodynamics, and **Babatunde Ogunnaike**, William L. Friend Professor, taught a course

on probability and statistics for engineers to beginning graduate students. The courses are designed to prepare the students for subsequent concentration in petrochemical engineering, materials engineering or environmental engineering sub-disciplines. The courses involved three hours of lecture each day, five days a week, for three weeks. "It is very important that we in the developed world do what we can to help to seed development in sub-Saharan Africa," Buttrey said. "Access to high-quality education is a critical component of this, and evidence of this can easily be seen by comparison with development in India over the past half-century, where the foundation of the Indian Institutes of Technology, starting with IIT-Bombay in 1958, helped to plant seeds for development there. The AUST is modeled after the successful IIT system, but differs in important ways, such as encouraging involvement of faculty from well-recognized programs around the world." Ogunnaike said the teaching opportunity is a small way in which UD can begin to fashion a conduit for exchanging people, programs, resources and research activities between the departments of

### **D**EPARTMENT **N**EWS

chemical engineering at UD and the AUSTs. "Perhaps this may lead to connections with other departments and centers at UD and elsewhere in future," Ogunnaike said. "UD has been involved in African concerns previously, such as with the successful Engineers without Borders program organized by Steve Dentel. This is the first time for UD to be involved with the AUST, since it is a new university. We hope to continue involvement with teaching at the AUST in Abuja, and perhaps at additional AUST sites as they are established--at least four are planned--and to expand this involvement to couple research programs and examine ways of exchanging students." AUST Abuja was established by the Nelson Mandela Institution (NMI) in 2007 as the first of a Pan-African network of institutes of science and technology and centers of excellence located across the continent. AUST Abuja, a National Universities Commission (NUC) accredited university, aims to become a world-class research oriented institution whose final objectives are to train and develop the next generation of African scientists and engineers and impact profoundly the continent's development through science and technology applications. AUST is an independent, not for profit university with a transparent governance system whose parent, NMI, is a private charity incorporated in the U.S.

#### **GRADUATING CLASS of 2008 HONORS DEGREE with DISTINCTION:**

The Honors Degree with Distinction recognizes a student's completion of the research requirements for the Degree with Distinction in addition to the successful completion of 30 credits in Honors courses through the degree program. The Honors Degree with Distinction is listed on each student's University of Delaware official transcript.

- Kevin Maggitti, Hydrogen Production from Ammonia, Doug Buttrey, advisor
- Matthew Reichert, RHEO-Small Angle Light
   Scattering of Worm-Like Micelle Solutions, Norman
   Wagner, advisor
- Brian Rosen, The Shear Thickening of Variably
   Shaped Particles in Newtonian Fluids, Norman Wagner,
   advisor
- Joshua Selekman, Developing Nanoparticles for Controlled DNA Release, Millicent Sullivan, advisor

### **D**EPARTMENT **N**EWS

**r. Thomas M. Connelly**, a member of Chemical Engineering's Advisory Board, was appointed by DuPont as their executive vice president and chief innovation officer, to lead the company's biotechnology push and its fast growing agriculture and nutrition business.

**Dr. Connelly** also participated on the UD Forum panel "Beyond Science: The Future of Health Care, America, and the Life Sciences at UD" at the May 10<sup>th</sup> Forum, Charting our Path to Prominence<sup>™</sup>.

**Linda J. Myrick**, Vice President and General Manager of Air Liquide Healthcare America Corp. -Scott Medical Products, and a member of our Advisory Board, was a panel member of *"In the Company of Women"* at the UD Forum, Charting our Path to Prominence<sup>TM</sup>, held May 10<sup>th</sup>.

he Society of Rheology has voted to establish a national award recognizing outstanding achievements by a young rheologist in honor of the late **Arthur B. Metzner**. The award is to be presented yearly at the national meeting and is the first award of its kind in the world. The society chose to name the award after Art because of the extraordinary role he played in fostering and encouraging the academic and scientific careers of many young rheologists. Special thanks go to Lynn Walker (PhD 95) for leading the effort to define and establish this award.

#### NSF Research Experiences for Undergraduates (REU): Alternative Energy Undergrad Internships Offered at UD



Top undergrads in chemical engineering from across the U.S. pursued cutting-edge research on alternative energy at the University of Delaware this past summer through an internship program sponsored

by the National Science Foundation (NSF) in the ongoing quest to develop a diverse, internationally competitive and globally engaged science and engineering workforce. UD's Department of Chemical Engineering and the Center for Catalytic Science and Technology will administer the three-year, \$300,000 NSF Research Experiences for Undergraduates (REU) grant, which will enable 10 exemplary students per year in chemical engineering to work with UD researchers on such projects as the design of new fuel cells, to the engineering of novel nanomaterial coatings to reduce the drag on ships in water. **Jochen Lauterbach**, professor, and Thomas Epps III, assistant professor, are co-investigators on the grant, which involves 10 faculty at UD in a diversity of energy fields, from high-throughput catalysis research to hydrogen and biodiesel production. To boost the participation of underrepresented students, Epps has been working to establish partnerships with Hampton University, Howard University, Delaware State University and Bucknell University. Under the mentorship of faculty advisers, students selected for the program not only conducted research, but also learned how to present their findings in scientific seminars and poster sessions. Field trips also expanded students' energy horizons. Visits were made to UD's Institute for Energy Conversion, a leader in solar cell research; Air Liquide in Glasgow, Del., which produces gases such as the hydrogen that is used in UD's hydrogen fuel cell bus; and Exxon Mobil in Clinton, N.J., where students learned about hydrocarbon processing.



Two UD Chemical Engineering professors, **Annette Shine** and **Millicent Sullivan**, hosted high school math and science teachers in their labs this summer under National Science Foundation grants aimed at fostering the active involvement of K-12 teachers and community college faculty in engineering research.

**Millicent Sullivan's** project is part of a major multidisciplinary program called "*Nature InSpired Engineering*" (NISE) that includes seven College of Engineering faculty and twelve teachers. Shine is supporting two additional teachers under an individual NSF grant whose objectives closely match those of the NISE program.

Led by Ken Barner, Professor in the Department of Electrical and Computer Engineering, NISE is funded through NSF's Research Experiences for Teachers (RET) program. According to **Kathy Werrell**, Assistant Dean and Director of Engineering Outreach, the program is aimed at fostering technological innovation in the classroom, facilitating the establishment of long-term collaborative partnerships, and providing teachers with an intellectually invigorating experience.

Sullivan is working with Nancy duBell, a math teacher at Aberdeen High School in Maryland; Elizabeth Cartier, a science teacher at Aberdeen; and Julia Somers, a senior in UD's math education program. In a project focused on nature-inspired drug delivery, the three are learning how synthetic and natural polymeric hydrogels can provide support to growing tissues and regulate the delivery of DNA and protein drugs. "My goal is for the teachers to understand chemical reaction kinetics and molecular transport concepts," Sullivan says, "and to adapt laboratory analytical techniques to classroom-accessible methods."



From back to front - Ellen Johnson, Elizabeth Cartier in the background Nancy duBell Loraine Snead, and the back of and Julia Somers in the foreground Annette Shine.

The teachers are learning those things—and more. An entry from duBell's blog recounting a "failure" in the lab suggests that the *process* may be even more important than the *product*. The entry begins, "The whole thing provides an interesting perspective into the world of research." With the wisdom gained from a weeklong trial-and-error process of obtaining inconclusive results, and a determination that the method they were using was taking the team down the wrong path, duBell concludes, "A wasted week? No, a valuable experience, and one not too different than researchers experience routinely."

Two science teachers from Wilmington Friends School, Loraine Snead and Ellen Johnson, are working with Shine on sensors for disease management. They are investigating the use of a mechanical resonator (i.e., a tuning fork) to probe the impact of glucose concentration on the rheological properties of "slime," an aqueous solution of poly(vinyl alcohol) that has been gelled using borax. Because glucose complexes with borax, the presence of glucose disrupts the gelation of slime. A version of this chemistry is being considered for use in implantable glucose sensors for diabetics.

"The teachers monitor how the pitch of the tuning fork immersed in glucose-containing slime changes with glucose concentration by analyzing the audio waveform of the tuning fork using audio signal processing software," Shine explains. "Our aim is to develop the measurement technique so that it can be performed by high school students."

All of the participants will are benefiting from online tools, including a wiki platform and video conferencing, that will enable the interactions among the faculty and teachers to be continued during the school year. These tools will also facilitate international collaborations. "We want the benefits and the relationships to go far beyond the six-week summer program," Barner says.

"This is a wonderful program," says **Michael Chajes**, Dean of Engineering, "and it meshes perfectly with the milestones identified as part of UD's recent strategic planning initiative—in particular, the goal to 'strengthen public education in Delaware and beyond' as part of The Engaged University milestone."

"In addition," he continues, "individual projects within the NISE program are addressing issues associated with other strategic milestones—for example, our energy, materials, and environmental engineering projects are all congruent with The Initiative for the Planet. And we're very pleased to have faculty participants from all five of our engineering departments as well as teachers from three states."

### Three Delaware Graduate Chemical Engineers win Prize for Research on Soft Matter



Soft matter research is a field of materials science that studies the properties and application of colloids, polymers, surfactants, gels, surfactants, and other soft biological matter. The SoftMatt 2008 Symposium (June 19, 2008) was a

forum in which graduate and undergraduate students involved in these soft materials research had the opportunity to share their progress and meet with peers from universities across the nation. This symposium was organized in conjunction with the international 82nd ACS Colloid & Surface Science Symposium held on June 15-18, 2008. Five graduate students were selected to deliver a 25 minute lecture at the symposium; the remaining abstract submissions were invited to present their research as a poster. Awards were given to talk presenters and the top three poster presentations in the graduate and undergraduate categories.

Several members of the Norman J. Wagner research group from the Department of Chemical Engineering were invited to present their research at the Symposium. Matthew Helgeson was one of the five participants invited to give a talk titled, "A microstructural understanding of shear banding in wormlike micellar solutions". Matthew placed first in the competition. Jason McMullan, Monica Branco, and Dennis Kalman were also invited to present posters on their graduate research at the Symposium, which included over 50 participants. Jason placed first in the poster competition with his poster titled, "Directed self-assembly of colloidal crystals by oscillatory shear and electric fields", and Monica placed second with her work on "Release of model macromolecules from self-assembling peptide hydrogels for injectable delivery". Dennis presented a poster on his research of the "Micromechanics of concentrated suspensions".

## MASS AND HEAT TRANSFER

Analysis of Mass Contactors and Heat Exchangers, by TW Fraser Russell, Anne Skaja Robinson, and Norman J Wagner



at the laboratory, pilot or commercial scale. The critical similarities between mass and heat transfer at both the equipment scale and transport phenomena scale are clearly illustrated.

If you would like to see how this works visit the website and give us your comments. We also invite you to test your skills against the web-based design and economics game.

#### CENTER FOR CATALYTIC SCIENCE AND TECHNOLOGY:

## Thirty Years of CELEBRATING History

he Center for Catalytic Science and Technology was formally established in 1977 following nine years of catalysis research from a nucleus of faculty hire in the chemical engineering dearound 1969. The center was

partment

YEAR

dedicated in April 1978. A. B. Metzner, then chairman of the department, was instrumental in supporting the idea of a center. The first director of CCST was Jim Katzer (later with Mobil Research and Development Co.). Bruce Gates was one of the co-founders, and later on one of the directors, who brought a lot of energy and enthusiasm to CCST activities. Ken Bischoff was among the first group of faculty who significantly contributed to the CCST success over many years. George Schuit from Eindhoven joined in 1970 for a sabbatical year and came back regularly for succeeding years. He provided much of the expertise for catalysis. Al Stiles from DuPont in the role of a research professor brought in 42 years of industrial experience in the early 1970s that guided the group. The first generation of CCST faculty was later expanded by a vigorous group of young faculty including Mark Barteau, Cecil Dybowski, Hank Foley, Michael Klein, Doug Ridge from both Chemical Engineering and Chemistry and Biochemistry departments. Other past CCST faculty include J. Bulkowski, H. Gold, S. Groh, D. Heck, H. Kwart, J. Olson, A. Rheingold, G. Schrader, R. Weber.

The industrial advisory council, led at first by Paul Weisz of Mobil, has always been critical in identifying opportunities for research and strengthening industry-CCST relations. Many industrial sponsors (12 in 1978-79 and 23 in 1981) have partnered over the years with CCST faculty, and this has always been and remains to be an important avenue for funding, research ideas, education enhancement, and collaboration. With the change in funding and corporate strategies, CCST funding has also shifted from mainly (~70%) industrial in the first few years to mainly federal in the past few years. NSF and DOE have been instrumental in supporting CCST research.

Reflecting on the success of CCST over the past 30 years, education of graduate students and postdocs has always been central to the center's mission. Hundreds of CCST alumni are working around the globe. More than 70% of our alumni have found employment with CCST sponsors. And a large fraction of our alumni have obtained academic positions and been very successful.

Annual CCST expenditures, at the level of \$2.5-3 millions, number of publications (~100), number of graduate students and postdocs (~60), over 100 attendees in our annual symposia, over the past few years (under the directorship of Jingguang Chen) speak to the vibrant environment of CCST. he 2009 edition of the U.S. News & World Report newsstand guidebook "America's Best Graduate Schools" ranks the Department of Chemical Engineering graduate program 10<sup>th</sup>, and the College of Engineering is ranked 46<sup>th</sup> in the nation for its graduate programs.

Fabric coated with shear thickening fluid developed by **Norman Wagner**, Alvin B. and Julia O. Stiles Professor and Department Chairperson, and the U.S. Army Research Laboratory was cited in a technology blog in the Dec. 25 *Washington Post*. The fabric was on display, along with other technologies, at Booz Allen Hamilton in McLean, Va.

The article "How Liquid Body Armor Works" at the website Howstuffworks can be accessed at <u>http://science.</u> howstuffworks.com/liquid-body-armor.htm/printable.

### Delaware experiment under way aboard ISS

University of Delaware experiment is under way aboard the International Space Station. The experiment is on structural and rheological transitions of field-responsive fluids in microgravity and was transported to the space station by the space



International Space Station commander Peggy Whitson sets up equipment in the Microgravity Science Glovebox

shuttle *Discovery*, which lifted off last October.

**Eric Furst**, associate professor, and his postdoctoral researcher **Paula Vasquez** developed the experiment as part of the In-SPACE2 (Investigating the Structure of Paramagnetic Aggregates from Colloidal Emulsions) program.

Furst said a long-

standing aim of complex fluid rheology has been to identify the fundamental roles that interactions on nanometer and micrometer length scales play in determining the rheological properties of these materials. Among the many types of complex fluid systems of interest, he said magnetorheological (MR) fluids provide a stunning example. MR suspensions exhibit a rapid transition from a liquidto solid-like state upon the application of a magnetic field, Furst said, explaining that the MR effect is due to induced interactions between dispersed, micrometersized superparamagetic particles. This rheological transition has the potential to provide the basis for technologies, ranging from actively controlled dampers and actuators to magnetically sealed bearings and sensitive stress transducers.

Applications to space exploration, he said, include potential use in robots, rovers and crew suits, with mobility augmentation, especially for endurance and fatigue countermeasure designs that aid in lifting, moving and supporting loads during extra-vehicular activities.

Furst said the MR fluid samples are being studied in the Microgravity Science Glovebox aboard the International Space Station. He said the space station commander, Peggy Whitson, has taken special interest in the experiments and has volunteered her time during Saturdays to push the programmed operations ahead. Furst and Vasquez monitor the experiments live at UD through a video link to the International Space Station and in conjunction with the Tele-Sciences Center at NASA's Glenn Research Center. There, project scientist Juan Agui and support staff communicate with Whitson, answering questions and providing feedback.

The objectives of the study are to understand, at a microscopic level, the structure formation, percolation and stress transduction mechanisms of MR fluids in an environment free from gravitational effects, such as sedimentation. By studying the behavior of these samples under the influence of magnetic fields in a microgravity environment, the team hopes to gain a better understanding of the physics of these unique materials, Furst said. -UDaily

The Senior Banquet took place May 21, 2008 at Hartefeld Country Club. Everyone had a great time.

Here are just a few pictures to share.



Senior Design Winners with Dave Short



Gina Palladino and Matt Reichert



Asha Quant, Kristen Collins and Modupeola Fadugba



TW Fraser Russell in the middle

## "BEYOND THE Blackboard"

hemical Engineering students at UD come from very diverse backgrounds. A strength of our program is the exchange of ideas resulting from the "intellectual caldron" fostered by the faculty, graduate students, and undergraduates. Every so often, along comes a student with the talent and drive to express their undergraduate experience in an art form transcending the engineering experience. Please come and enjoy Modupeola's expression of her UD CHEG experience on display in Colburn Lab's green-side entryway.

We asked **Modupeola Fadugba** to write a few words about her background and the painting entitled *"Be*yond the Blackboard".

*Chemical Engineering and the third world*. Two seemingly discrete entities and the place where the two converge is somewhere deep in my mind's eye. As a citizen of two third world countries, Nigeria and Togo, I was born in the latter, where I lived for 5 years, before moving to Delaware. Having inhabited six different countries in three continents, I acknowledge that the vast differences in opportunities, economy, and the distribution of wealth associated within locations play a vital role in the overall success of a person, and their ultimate development through life. I realize that in all I have been quite fortunate.

In January 1997, my parents were summoned to work for the United Nations International Criminal Tribunal for Rwanda, an organization established in 1994 to deal with genocide, war crimes, and crimes against humanity committed during that year in Rwanda. In Rwanda I witnessed first-hand, the consequences of poverty and misrule. Because the school system in Rwanda was still under reconstruction, my parents made the decision to send my siblings and me to boarding schools in Bournemouth, England. For the following 6 years, we continued our education, only coming home (to Rwanda) for Christmas, Easter, and summer holidays. As much as my parents tried to keep us from being affected by the situation in Rwanda, I understood that the needs of impoverished societies had to be addressed. Throughout high school, I had a personal burden to address these issues, by dreaming up large scale and effective projects that could serve as the catalyst for the transformation and development of the third world.

At age 17 I felt that background training in engineering, economics, and management was the spark I would need to ignite the essential qualities that I hoped would one day make me an effective leader in my community. This brought me to UD, where my mother completed her Masters degree in International Relations. My own goal was to get my first degree in Chemical Engineering- a feat that challenged me in every possible aspect of my life. By the time I started college my family had moved, yet again, to Tanzania, where I conducted my first art exhibition, in which I painted and sold over 40 paintings. I am tremendously thankful for the support of the clientele, who came from all corners of the world. I found that artwork was yet another form of relating with people on a different level regardless of their race, religion, or political origin- an important feature for successful development today.

It was a privilege to be asked to create a painting for the Chemical Engineering department. For three months I tossed around concepts and ideas, and finally decided to incorporate the chemical engineering experience through the eyes of the class of 2008, the third world and economics into one image. Often misunderstood as a fleeting, beautiful creature, I attempted to capture the often unseen resilience of the butterfly. I used the four stages in the metamorphosis of a butterfly to represent the freshman, sophomore, junior and senior year in the realm of Colburn. Freshmen are depicted as eggs, and the sophomore year is represented by the caterpillar stage, where several counterparts fall through the cracks - resulting in a shocking class size reduction and a wake up call. Then comes that third year, where time is distorted and sleep is scarce. Finally, emerging from the cocoon (if one manages to conquer j-lab) there is a transformation into the famed winged troubadour in pursuit of stasis and stability. To pay homage to the professors and their contributions to the world of academia, I took the titles and dates of each of their first publications and superimposed them on the steps. Furthermore, the distillation set-up at the left side of the painting, where the African child collects water in a pot portrays the idea that the subject matter studied here at Delaware undoubtedly affects the third world and the world at large.



## Honors Day Awards

### **M**AY **9, 2008**

#### **Department Awards**

**Marcus Adams** received the American Chemical Society Award in Chemical Engineering

**Jeffrey Bosco** received the American Institute of Chemical Engineers Junior Award

**Michael Dignan** received the American Institute of Chemical Engineers Senior Award

**Michael Albani** received the American Institute of Chemical Engineers Sophomore Award

Justin Federici received the Center for Composite Materials Achievement Award

**Jeffrey Knopf** received the Center for Composite Materials Outstanding Senior Award

Matthew Helgeson received the Center for Composite Materials Progress Award

**Scott Zero** received the Center for Composite Materials Undergraduate Research Award

**Emrys Smith**, **Joshua Martin** and **Michael Zeberkiewicz** received the Chemical Engineering Alumni Laboratory Award

**Anshu Arya**, **Lindsay Schmiedel** and **Megan Zagrobelny** received the Chemical Engineering Class of 1950 Award

**Derek Falcone** and **Van Lam** received the Chemical Engineering Class of 1952 Award

Joseph Natale received the Chemical Engineering Class of 1953 Award

Amy Chevalier, Stanley Herrmann, Nicholas Marze, Joseph McManimon and Dariusz Murakowski received the Chemical Engineering Industrial Sponsors Scholarship Award

**Michael Dignan** and **Jeremy Miletics** received the Chemical Engineering Industrial Sponsors Senior Award

**Brian Rosen** and **Joshua Selekman** received the Chemical Engineering Industrial Sponsor Undergraduate Research Award

**Chelsea Dougherty** and **Megan Zagrobelny** received the George Fish Scholarship

**Jeff Bosco** and **Rebecca Pagels** received the Hess Corporation Award

**Ankur Doshi** and **Tompall Toone** received the Sylvia and Charles Joanedis Chemical Engineering Scholarship

**Alyssa Banks** and **Jason Papandrea** received the Mr. & Mrs. James F. Kearns Scholarship in Chemical Engineering

Marcus Adams and Chondra Almeida received the Merck Engineering and Technology Scholar

Michael Albani and Marco Bedolla-Pantoja received the

Merck Outstanding Chemical Engineering Student Award

**Carly Fleagle** received the Steven R. and Linda Justice Myrick Award

**Timothy Bogart**, **Kyle Hoffman** and **Scott Zero** received the National Starch & Chemical Company Undergraduate Scholarship

**Marcus Adams** received the Donald F. Othmer Sophomore Academic Excellence Award

**Monica Branco, Stuart Collins, Justin Federici** and **Dennis Kalman** received the Robert L. Pigford Teaching Assistant Award

**Eric Bennung**, **Jeffrey Bosco**, **Joshua Comden**, **Melissa Day** and **Manuel Jimenez Diaz** received the Robert L. Pigford Undergraduate Award

**Mary McDonald** received the Fraser & Shirley Russell Teaching Fellow in Chemical Engineering

Nitika Gupta received the Stanley Jacob Schechter Award

**Daniel Miller** received the Schipper Undergraduate Chemical Engineering Scholarship

**Zachary Ulissi** received the Walter Silowka Chemical Engineering Scholarship

**Martha King** received the John Allan Thoroughgood Legacy Scholarship in Chemical Engineering

#### **University Award**

Jeffrey Bosco received the Barry M. Goldwater Scholarship

#### **College Awards**

Chondra Almeida received the TEHEKA Scholarship

Manuel Rafael Jiminez Diaz received the Wisner RISE Award

Christopher Leininger received the McCoy Scholarship

**Rebecca Pagels** received the Dan Roarty Memorial Scholarship

Thomas Scherr received the Terry F. Neimeyer Scholarship

**Carolyn Slusser** received the Engineering Alumni Association Scholarship

#### **Grad Student Recognition/Awards**

**Elizabeth D'Addio** was selected for a Young Scientist Award of the International Congress on Catalysis 2008. The award recognizes her outstanding submission to the 14<sup>th</sup> ICC titled *"Hollandite-based ammonia decomposition catalysts discovered using high-throughput experimentation"* and was presented at Seoul, South Korea, in July 2008.

Dan Esposito won the NASA Graduate Fellowship.

Two students from UD's first IGERT cohort, **Dan Esposito** and **Meghan Schulz**, attended the first Conference for Sustainability IGERTs at the University of Alaska Fairbanks. The student-run workshop involved students and professors from IGERT programs nationwide. **Matt Helgeson** received a poster award (entitled "Spatiallyresolved structural evolution of wormlike micelles through the shear banding transition") at the 4<sup>th</sup> biennial American Conference on Neutron Scattering held in Santa Fe NM (May 2008). The conference is sponsored by the Neutron Scattering Society of America, and is intended to showcase recent scientific results in neutron science in a wide range of fields, including soft and hard condensed matter, liquids, biology, magnetism, engineering materials, chemical spectroscopy, crystal structure, fundamental physics, and developments in neutron instrumentation. Matt also received the NSSA Prize for Outstanding Student Research. The NSSA student prize is awarded for excellent research using neutrons forming part of a student thesis. The award consists of a certificate, plaque, and \$500.

**David Johnson** was a recipient of the NASA Delaware Space Grant Consortium Grant Fellowship to start in the fall of 2008.

**Julie Lawson** received the prestigious 2008 NSF Graduate Research Fellowship award.

**Mary McDonald** received the Fraser and Shirley Russell Teaching Fellowship in Chemical Engineering. Mary also received this year's Association for Women in Science Philadelphia Chapter (AWIS-PHL)'s Robert E. Davies Student Travel Award. Mary used this to travel to the Research Society on Alcoholism annual meeting.

**Jason McMullan** won the ACS Delaware Session Poster Award on April 30, 2008.

**Carl Menning** won the Graduate Student Award from the American Vacuum Society (AVS), which gives out awards to ten students each year in surface science.

**Michelle O'Malley** was awarded the Biophysical Society Student Travel Grant to attend the annual Biophysical Society Meeting. Michelle was also awarded the Women's Initiative Committee AIChE Student Travel Award to attend the annual AIChE meeting. Michelle also won Best Overall Poster at the Biochemical Engineering XV Meeting. This prize was sponsored by Merck.

**Bill Pyrz** received the Distinguished Scholar Award from Microscopy and Microanalysis for his paper, "Using Aberration-corrected STEM Imaging to Explore Chemical and Structural Variations in the M1 Phase of the MoVNbTeO Oxidation Catalyst." It will be presented at the Microscopy and Microanalysis meeting in Albuquerque, New Mexico in August 2008. Bill also received the AIChE CRE Division Student Travel Award for the AIChE Annual Meeting held in Salt Lake City, Utah in November, 2007. His poster title was "Characterization of K-Promoted Ru Catalysts for Hydrogen Production Via Ammonia Decomposition".

**Alan Stottlemyer** received a University of Delaware Graduate Fellowship from the Office of Graduate Studies.

**Erik Welf's** submission, "*Regulation of Integrin Clustering: Models and Experiments*", to the 2008 q-Bio conference in August was selected for a "spotlight talk."

#### **Undergrad Student Recognition/Awards**

**Eric Bennung** received an Alumni Enrichment Award and a Summer Research Fellowship.

**Anne-Marie Biser** was honored at the Latino/Latina Students of distinction reception held April 26, 2008 for her academic achievements during the 2007-08 academic year.



Jeffrey Bosco received the Barry M. Goldwater Scholarship, which is a University award that was presented at Honors Day held May 9, 2008. Jeff is a Chemical Engineering junior with minors in chemistry, mathematics and Japanese language. The Goldwater scholarship is designed to encourage outstanding students to pursue careers in the fields of mathematics, the natural sciences and engineering. This is

the premier undergraduate award of its type and covers the cost of tuition, fees, books and room and board up to \$7,500 per year. Jingguang Chen is his advisor. Jeff is also the AIChE Student Chapter President.

Asha Quant, senior, earned All-East honors with a fourth place finish in the women's long jump as the Fightin' Blue Hens track and field teams competed at the IC4A and ECAC championships in May at Princeton University's Weaver Stadium. Asha capped an outstanding career as she took fourth with a school-record leap of 19 feet, 11.5 inches, breaking her own mark of 19 feet, 8 inches set last season.



She earned All-East honors for the first time in her career and also qualified for the NCAA Regionals held May 30-31 at Florida State University.

**Tom Scherr**, senior, was named second team All-America for men's lacrosse as part of the Lowe's Senior Class Award Program.

**Josh Selekman** won a \$2,000 AAUP (American Association of University Professors) Student Award for graduate study. His senior thesis topic is non-viral gene delivery vectors for packaging and transporting DNA.

**Zachary Ulissi** received the Northeastern Chemical Association Summer Research Scholarship through URP, a Delaware Space Grant Tuition Scholarship, a Society of Photographic Instrumentation Engineers (SPIE) Scholarship, and a Mathematical Contest in Modeling: Outstanding Solution (2008) awarded to the top 9 out of 1,162 international teams.

## COLBURN HISTORY

There are a number of named lectures held in the department every year. This year we highlight the Allan P. Colburn Lectureship.



**Ilan Colburn** was born and educated in Wisconsin and was the first employee of the DuPont Company to be hired as a research engineer rather than an engineer charged with carrying out process development functions. This research group, organized in 1929 by Thomas Chilton, brought these two very productive people into a close contact, though one which

lasted less than a decade because of problems with Allan Colburn's failing health. The Chilton-Colburn contributions to understanding the similarities between rates of heat, mass and momentum transfer appeared in 1930 in a rough form and, in the final polished form, in a paper authored by Colburn alone in 1933. This "Colburn analogy" paper was followed by one on design of cooler-condenser systems and another which developed the concept of a "height of a transfer unit" of HTU. Both these papers were actually presented by Chilton at AIChE meetings because Colburn was not well enough to attend. Two other frequent co-workers were William McAdams (MIT) and Thomas Drew (Columbia) who served as DuPont consultants during these years, and Colburn authored a large number of papers on heat and mass transfer which reflected their input as well; the Colburn-Drew paper of 1937, on condensation of mixed vapors, is perhaps his second most important contribution to chemical engineering science. In addition to authoring good scientific analyses, he also published a large number of pragmatic papers on heat transfer in a variety of geometries, on distillation and on fluid metering. In 1938 Allan Colburn's tuberculosis had sufficiently weakened him that he had to resign his industrial position and look for part-time employment under conditions that might enable him to choose his own working hours. This was how he arrived at the University of Delaware; but he did not really retire. The wartime chemical engineering curriculum for Army Officers (the Army ASTP program of WWII) which enrolled many thousands (perhaps five to ten thousand students) was written by Allan Colburn and Barnett Dodge of Yale. Colburn became Acting-President of the University of

Delaware in 1950 and was Provost from 1950 until his death from cancer in 1955. He was the first recipient of the Walker Award of the AIChE in 1935 and also the first recipient of the Professional Progress Award in 1948. He was Chairman of the heat transfer division of ASME and a director of AIChE from 1942 to 1947 and served on numerous governmental advisory committees. He was Director of the Delaware Chapter of the American Red Cross from 1946 until his death and served as a member of the research committee of the American Cancer Society. In summary, he was a most distinguished engineer and a very humble, compassionate and most helpful human being who was seriously ill throughout his professional career. The reason for the Annual Allan Colburn Lectureship is to recognize those young faculty or engineers who best exemplify Allan Colburn's scholarly abilities on pragmatic as well as theoretical problems and his interest in all humanity.

#### **Allan P. Colburn Memorial Lectures**

1972 Edward L. Cussler, Carnegie Mellon University 1973 Dale Rudd, University of Wisconsin 1974 James White, University of Tennessee 1975 Louis Hegedus, General Motors 1976 John H. Seinfeld, California Institute of Technology 1978 Clark K. Colton, Massachusetts Institute of Technology 1978 L. Gary Leal, California Institute of Technology 1980 James A. Dumesic, University of Wisconsin 1981 A. C. Payatakes, University of Houston 1981 T. W. Fraser Russell, University of Delaware 1982 Michael L. Shuler, Cornell University 1983 Rakesh K. Jain, Carnegie Mellon University 1984 Matthew V. Tirrell, University of Minnesota 1985 Klavs F. Jensen, University of Minnesota 1986 Robert A. Brown, Massachusetts Institute of Technology 1987 Julio Ottino, University of Massachusetts at Amherst 1988 H. Chia Chang, University of Notre Dame 1989 Sangtae Kim, University of Wisconsin 1990 Alice P. Gast, Stanford University 1991 Glenn H. Fredrickson, University of California, Santa Barbara 1992 Doros Theodorou, University of California, Berkeley 1993 Arup Chakraborty, University of California, Berkeley 1994 Yannis G. Kevrekidis, Princeton University 1996 John M. Vohs, University of Pennsylvania 1997 Wesley R. Burghardt, Northwestern University 1998 Julia A. Kornfield, California Institute of Technology 1998 Chaitan S. Khosla, Stanford University 1999 K. Dane Wittrup, Massachusetts Institute of Technology 2002 Jay Keasling, University of California, Berkeley 2004 Sharon C. Glotzer, University of Michigan 2005 Michael D. Graham, University of Wisconsin-Madison 2006 Patrick Doyle, Massachusetts Institute of Technology 2008 Michael S. Strano, Massachusetts Institute of Technology

### **CONTRIBUTIONS FROM ALUMNI & FRIENDS**

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: <u>alumni-news@che.udel.edu</u> so that we may correct the error. (Gifts received from July 1, 2007 through June 30, 2008.)

David C. Adams, M.D. Air Products and Chemicals, Inc. American Chemical Society - PRF Dr. and Mrs. Robert J. Anderson Mr. Tanner R. Andrews John P. Anerousis, P.E. Dr. and Mrs. Michael J. Angelo AutoImmune Inc. Dr. and Mrs. Byron D. Babcock Mr. Christopher E. Banschbach Dr. Mark A. Barteau & Dr. Diane V. Jorgensen Mrs. Doris F. Baumgarten Mr. and Mrs. James J. Behen III Dr. Paul K. Behrens Dr. Kenneth J. Bell Dr. and Mrs. Barry J. Bentley Dr. and Mrs. Michael J. Betenbaugh Dr. Manoj V. Bhinde Mr. R. Byron Bird Dr. Marsha Stalker Bischel Mr. and Mrs. Brian J. Bockrath Mr. Richard E. Bockrath Boehringer Ingelheim Cares Found. Mr. and Mrs. John Bolinski Dr. and Mrs. Peter Bouloucon Mr. Gail E. Braden Dr. Larry D. Bravenec **Bristol-Myers Squibb Company** Dr. Dennis H. Broderick Mr. Douglas F. Brown Dr. George A. Brown Mr. Lawrence A. Brown Dr. and Mrs. Lee F. Brown Ms. Susan Brynteson Mr. and Mrs. Paul T. Bucci Dr. Marie Buchtelova Mr. and Mrs. Eugene H. Buck Mr. John H. Buehler Mr. and Mrs. Robert W. Burket, Jr. Mr. and Mrs. Norman M. Burns, Jr. Dr. and Mrs. Brian W. Bussey Mr. Michael D. Cabelli

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Chemical Engineeri	If you have events happen during the year, please share them with us to be included in the next Newsletter. We would also love to include any pictures you may have. Complete this page and mail to: Office of the Chairman, Chemical Engineering, University of Delaware, Newark, DE 19716, or drop us an e-mail: <u>alumni-news@che.udel.edu</u> .
Name	UD Degree Date
Notes	
What's	
New?	

### Path to Prominence™ executive summary and guiding principles.

## The Path to Prominence<sup>™</sup>: A Strategic Conversation

e stand at a critical milestone in the history of the University of Delaware. With roots reaching back to 1743, we now are a community of 16,000 undergraduates, 3,500 graduate students, 1,200 faculty, and 135,000 alumni, who excel in diverse fields and hail from all corners of the world. We stand as one of the top universities in the country, with growing international stature in vital areas of expertise. At this moment, we are setting out on a new path designed to engage closely with the critical issues of our day, to increase the global impact of the University, and to raise its prominence in the world.

This strategic plan, which charts our "Path to Prominence"," is part of a continuing University conversation. Our dialogue has taken place in hundreds of meetings and communications across the campus, as well as the broader alumni and Delaware community. Across the community, there is enormous enthusiasm for the University's current strengths and future potential. While our scope and timetable have been ambitious, this process has resulted in one of the broadest and most far-reaching discussions about the University's future in recent history.

As the planning and implementation process now rolls out across the University at the college, school, and unit level, this dialogue will guide our steps, offering fresh ideas and approaches. While this dialogue will shape our steps, our overall path and destination remain constant: to fulfill the mission of the University and to be recognized around the world as one of the great public institutions of higher education in America.

To advance, we must build key strengths in areas critical to our region and the world, and increase recognition

of our existing strengths. Outlined here and discussed in more detail in this plan are the common goals and values that will align the energies and efforts of a community as broad and diverse as the University of Delaware.

In pursuing this path, we carry the aspirations and dreams of generations of builders and graduates of the University of Delaware. This is our legacy. We invite you to join with us in pursuing this Path to Prominence<sup>™</sup>. In the words of the Blue Hen's fight song, "Let Delaware shine." *Patrick T. Harker President, University of Delaware* 

#### **Guiding Principles: What We Value**

In discussions across the University community, we identified five guiding principles that represent our commitments to the world:

**Delaware First** – Our first commitment is to be the flagship of higher education for the State of Delaware – ensuring that every Delawarean has access to a top-quality education and applying our strengths to benefit the greater Delaware community.

**Diversity** – We will foster a robust educational environment in which all people are welcome and feel welcome – one that supports critical thinking, free inquiry, and respect for diverse views and values.

**Partnership** – We will create innovative partnerships for economic and community development, building knowledge and promoting ideas that serve the critical needs of the state, the nation, and the world.

**Engagement** – We will engage students, faculty, staff, and alumni in the most compelling social, cultural, artistic, and scientific challenges of our age – taking our place among the world's leading universities.

**Impact** – Our job is not done until our ideas, our expertise, and our students are given the opportunity to make a significant difference in the world. To succeed, we must assure that the University's innovation and accomplishments are publicly known throughout Delaware, academia, and across the nation and the world.

To learn more about this, please go to: www.udel.edu/ prominence

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