



Mechanical Engineering News

University of Delaware

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The ME Business and Careers Conference brought more than 200 people to campus in April. See stories beginning on p. 5.

Cheers from the Chair



Editor's note: ME Chair Tom Buchanan provided the welcome to the Business and Careers Conference. Here, he summarizes his thoughts on the event and on the topic of his welcome message: the past, present, and future of mechanical engineering.

We're very pleased to have hosted the second annual alumni career celebration, renamed and reconfigured this year as the Mechanical Engineering Business and Careers Conference. The conference provides us with a forum for honoring our alumni, offering valuable career advice and networking opportunities, and showcasing our research.

It also gives us a chance to reflect on changes in the field of mechanical engineering in general and in our program here at UD in particular. During the past century, our focus has evolved from engines to modern technologies such as advanced composites, fuel cells, and control systems.

From a global viewpoint, the U.S. is facing a serious technological challenge from China, where things are happening at a very rapid pace. Thirty-three percent of undergrads in China are majoring in engineering, while only 15 percent have selected this

career choice in the United States. China has 1,274 ME programs, the U.S. only 308.

However, these numbers don't mean that we're doomed to be overshadowed, as there will still be a huge demand for engineers here. Many companies want and need U.S. engineers and cannot outsource engineering abroad due to security constraints. For example, Lockheed has announced that they need to hire 14,000 engineers this year, and that number will rise to 44,000 in three years. This evidences a huge demand, since there are only 62,000 graduates per year in the U.S. receiving BS degrees in engineering.

As Lockheed CEO Robert Stevens stated in a recent *Wall Street Journal* article, "Science and engineering aren't just crucial for national security; they're critical for economic growth. High-tech industries drive development, boosting productivity and generating good jobs. If the U.S. intends to remain the world's technological leader, we have to act today, inspiring more young people to thrive in advanced-tech careers."

I think we're doing that here at UD. We have ongoing research programs in a number of high-tech areas, including biomedical, composites and materials, clean energy, and robotics and controls. The quality of our students has risen markedly over the past few years, and we expect this trend to continue. We have a strong undergraduate research program, which has exposed our top students to the research experience and resulted in some of them co-authoring papers in refereed journals.

And we're very proud of our alumni, a group that includes 110 CEOs, presidents, and principals, 56 vice presidents, 11 attorneys, three physicians, one dean, and one

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department head.

Our alumni inspired the first career celebration last year, and their continued achievements and accumulated wisdom will provide the foundation for us to continue this event in the future. If you missed coming this year or last, we urge you to join us next year.

Life is good here, and we want you to be a part of it.

Editor's Notes

I hope you enjoy reading about the Business/Technology and Careers Conference, held April 28 this year, that is highlighted in this issue of ME News. This was the second Career Celebration event of this kind, and by all accounts it exceeded the success of the first. This year we also cited five alums for having Distinguished Careers, and they join the first class of ten Distinguished Career Alums cited last year. The five were honored at the Conference. I continue to be amazed at the career accomplishments of our ME alumni brothers and sisters!

One of the reasons for the success of this year's event was the business conference format, which was the brainchild of Jim Hutchison '78. Another was the greatly increased attendance by undergrads. Alumni, students, and faculty had many opportunities to interact during the afternoon and evening. The only disappointment was that only about 50 alums took advantage of this opportunity—the same as last year. Over 2,700 alums (~1,600 within a 100-mile radius) worldwide were invited. We are beginning to plan the Alumni Relations program for next year, and we will try to improve upon this year's success. Please let us know what you think about the Business and Careers Conference, and/or other ways to achieve a mutually beneficial relationship among alumni, students, and faculty.

Nate Cloud '64, ME Alumni Relations Coordinator

In Memoriam:

John R. Zimmerman



John Richard Zimmerman, Professor Emeritus of Mechanical Engineering at the University of Delaware, died on April 28, 2006, at his home in Newark, DE. He was 80 years

old. Zimmerman received his Bachelor of Engineering from Yale University, his Bachelor of Sacred Theology degree from Boston University, and his M.S. and Ph.D. degrees from Lehigh University. He joined the UD-ME faculty in 1976 and retired in 1988. Zimmerman is credited with establishing the Senior Design Program at the University of Delaware, in which students

were hired to design projects for actual clients, providing them with the real-world experience of engineering. He published *Elementary Kinematics of Mechanisms* in 1962, *Machine Design Fundamentals* with co-authors in 1983, and a chapter on "Brakes and Clutches" in *Handbook of Machine Design*, which won a prize for best technical book in 1986.

Mechanical Engineering Calendar of Events

DATE	EVENT	DATE	EVENT
Mon., 8/14	Late registration & change of registration for Fall 2006 begins via the web	Mon., Nov. 20	Registration for Spring Semester 2007
Tues., 8/15	Deadline for graduate admission recommendations from depts. for Fall 2006	Mon., Nov. 20	Deadline for submission of master's thesis for Dec. 06 degree conferral
Fri., 8/25	ME Faculty Retreat	TBA	ME Honor Students Gathering
Sat., 8/26	Fall New Student Orientation Phase II	Wed., 11/22	Thanksgiving recess begins at 5:00 PM
Sun., 8/27	ME Picnic - White Clay Creek State Park	Th & Fri 11/23 & 24	Thanksgiving Vacation - Classes suspended; University offices closed
Mon., 8/28	Academic Orientation/New Student Convocation/Workshops/Activities Night	Fri., 12/1	Deadline for graduate applications for admission in Spring 2006
Tues., 8/29	Fall 2006 Classes begin 8:00 AM	Wed., 12/6	Faculty meeting
Tues., 8/29	Senior Design Sponsor Night 4-10:00 PM	Wed., 12/6	Last day Fall 2006 classes
Thurs., 8/31	Deadline for admission to PhD candidacy for Dec. 2006 & Winter 2007 degree conferral	Thurs., 12/7	Reading Day
Fri., 9/1	Machine Shop Open House, 11:00 - 2:00, SPL	Fri., 12/8	Fall 2006 Final Exams begin
Mon., 9/4	Labor Day Holiday - University Office Closed	Fri., 12/15	Deadline for submission of advanced degree applications for degree conferral 07W
TBA	Graduate Student Orientation/Luncheon	TBA	Senior Design Final Presentations
Tues., 9/12	Last day to register or to add course for Fall 2006	Fri., 12/15	Fall 2006 Final Exams End
Tues., 9/12	Deadline for completion of incomplete work from Spring & Summer 2006 for undergraduates	Fri. 12/22 to Mon. 1/1	Holiday break - Classes suspended; University Offices closed - reopen Jan. 2
Tues., 9/12	Senior Design Pizza party	Wed., 1/3	Winter Session 2007 begins - 8:00 a.m.
Wed., 9/13	Faculty meeting	Fri., 1/5	Doctoral Hooding Ceremony
Wed., 9/13	Graduate Student & Faculty photo session - 10:00 - 11:30, 126 SPL	Sat., 1/6	Commencement
Fri., 9/15	Deadline for submission of advanced degree Application for Dec. 06 degree conferral	Mon., 1/8	Last day of late registration & free drop add for Winter 2007
Fri., 9/15-17	Freshman Family Weekend	Mon., 1/15	Martin Luther King - Classes Suspended; University Offices closed
Tues., 9/26	Graduate Student Reception, 11:00 AM to 12:00 PM at the Bob Carpenter Ctr.	Tues., 1/16	Deadline for graduate admission recommendations for Spring 2007
Tues., 9/26	38th Annual Job Jamboree, 1:00 - 4:30 PM at the Bob Carpenter Ctr.	Tues., 1/16	Deadline for submission of dissertations & thesis for Winter 2007 degree conferral
Sat., 9/30	Blue & Golden Saturday (for prospective students)	Thurs., 1/18	New Student Orientation - Phase I
Wed., 10/4	Faculty meeting	Thurs., 1/18	Last day to change registration or withdraw for Winter 2007
Sat., 10/7	Blue & Golden Saturday	Thurs., 2/1	Deadline for admission to doctoral candidacy for conferral Spring 2007
Fri., 10/13	College of Engineering Homecoming Luncheon	Fri., 2/2	Last Day of Classes - Winter Session
Fri., 10/13	Freshman mid-term marking period ends	Sat., 2/3	Winter 2007 Final Exams
Sat., 10/14	Homecoming Weekend	Mon., 2/5	Spring Semester 2007 begins at 4:00 pm
Sat., 10/21	Blue & Golden Saturday (for prospective students)	Mon., 2/5	New Student Orientation - Phase II
Tues., 10/24	Last day to change registration or to withdraw from 06F courses	Fri., 2/16	Deadline for submission of advanced degree applications for degree conferral Spring 2007
T & Th 10/24 & 26	Senior Design Oral Presentations	Sun., 2/18	National Engineers Week
Fri., 10/27	Deadline for completion of incomplete work from 06S & 06J for graduate students	Fri., 2/16	Last day free add/drop for Spring 2007
Mon., 11/6	Registration begins for Winter Session 2007	Fri., 2/16	Deadline for completion of incomplete work for Fall 2006 & Winter 2007 for undergraduates
Tues., 11/7	Election Day; classes suspended & University offices closed	Tues., 2/20	Order of the Engineer Ring Ceremony
TBA	Graduate Symposium	TBA	Senior Design Appreciation Night
Wed., 11/1	Faculty meeting	Wed., 2/21	Engineering & Technology Career Fair, 1-4:00 PM, Trabant Center
Mon., 11/13	Deadline for submission of PhD. Dissertations for Dec. 06 conferral		

Faculty and Student Highlights

Faculty



Suresh Advani, George W. Laird Professor of Mechanical Engineering, presented his Named Professor Inaugural Lecture to the University on “Modeling and Simulation of Composite Manufacturing Processes: The Road Less Traveled,” on March 22, 2006, followed by a reception at DuPont Hall.



Prof. **Andras Szeri** received the Society of Tribologists and Lubrication Engineers (STLE) International Award on May 9, 2006, in Calgary at the Society’s Annual Meeting. The Society’s highest technical honor, the award recognizes the recipient’s outstanding contributions to tribology, lubrication engineering, or allied fields. The award bestows lifetime honorary membership on the recipient, who need not have been a member of STLE.



Prof. **Len Schwartz** appeared on WHYY News to discuss the recent C-5 plane crash at Dover Air Force Base. He was selected on the basis of his expertise in aerospace engineering.



Dr. **Xinyan Deng** and her research were highlighted in an article in the *Wilmington News Journal* on March 29th. Entitled “What’s bugging her?” the article covers Deng’s innovative research on the flight of insects and its potential use in microrobotic flying machines. Deng recently won a prestigious Faculty Early Career Development Award from the National Science Foundation to support her work in this area. The five-year grant totals \$455,000.



Prof. **Ajay K. Prasad** visited the University of Alabama on April 6, 2006, and gave a presentation on recent results from his fuel cell research. He presented a talk on Sustainable Energy at UD-ME’s Business and Career Conference on April 28, 2006, in which he discussed fuel cells and wind energy (see article in conference insert of this issue of *ME News*). Prasad also discussed fuel cell technology and the hydrogen infrastructure on WILM-AM on May 11, 2006.



Dr. **Anette M. Karlsson** gave an invited talk at the “Summer School on Layered, Functional Gradient Ceramics and Thermal Barrier Coatings” in Mao, Spain, on June 15, 2006. The event was sponsored by the European

Commission on “Improving Human Research Potential and the Socio-Economic Knowledge Base.” (The commission is comparable to the National Science Foundation in the U.S.) Her talk was entitled “Modeling Failures of Thermal Barrier Coatings.”

Graduate Students

Le Zhang, student of Dr. Andras Z. Szeri, received the Elisha Conover Endowed Fellowship. The Office of Graduate Studies established the fellowship, valued at \$5,000, for a graduate student studying fluid dynamics. The fellowship was made possible by a gift from Theodore Dean Foster in memory of his late great-uncle, Elisha Conover, who taught Latin and Greek at the University of Delaware for over 40 years.

Xiaoyi Li, student of Dr. Kausik Sarkar, received the University Graduate Fellows Award by the Faculty Selection Committee for the 2006-2007 academic year. This award, given in recognition of his prior academic achievements and potential for success in his field of study, consists of a stipend plus a full tuition scholarship for the Fall 2006 and Spring 2007 semesters. The stipend award is in partnership with the Mechanical Engineering Department.

Debra Grace George, student of Dr. Jill S. Higginson, received the prestigious George W. Laird Fellowship for 2006. (See story on page 14)

Higginson Research Targets Osteoarthritis

Osteoarthritis (OA) is a degenerative joint disease that affects millions of people in the United States. It is the leading cause of disability with a cost to the insurance industry of over 86.2 billion dollars annually. In the Neuromuscular Biomechanics Lab, Dr. Jill Higginson and her research team are currently conducting a research study that will help

gain a better understanding of the progression of the disease. This project is funded through a Center for Biomedical Research Excellence award from the NIH which represents a collaborative effort among investigators from across the University of Delaware to study biological, mechanical and therapeutic aspects of OA progression. The objectives of Dr. Higginson’s study are to determine how walking patterns and the underlying muscle coordination strategy change with OA progression. It is hoped that an improved understanding of muscle coordi-

nation in OA gait may shape the design of therapeutic interventions for prevention of further joint deterioration.

Editor’s Note: Prof. Higginson and her research group are seeking healthy adults and persons with knee arthritis for their for research study. If you are between the ages of 40 and 75 and can walk on a treadmill for 8 minutes, please consider volunteering as a subject. Contact Joe at (302) 831-0759 or jenijr@udel.edu, or visit the project web site for more details: http://research.me.udel.edu/higginson/Knee_Study.htm

***University of Delaware Department
of Mechanical Engineering Business
and Careers Conference***



NASA

Conference keynote speaker Jerry Kegelman '78 of NASA spoke about the Columbia disaster. See story on p. 12.

Overview of the Day

Excellent. Unique. Worthwhile. Informative. Germane. These are just a few of the adjectives used by attendees to describe ME's Business and Careers Conference, held at the John M. Clayton Conference Center on Friday, April 28.

Others commented that the event was a very good resource for networking with companies and should be included in the undergrad curriculum. "I was very pleased to see the growth in student participation," said one attendee."

An effort to increase student participation was part of the motivation for changing the name of the event this year. While the conference was the second in what is now an annual series, in 2005, it was referred to as the Alumni Career Celebration.

"Alumni and their careers are still a major focus of the event," says ME Alumni Relations Coordinator Nate Cloud

'64. "There are many active alums in this area, and they have a tremendous amount of knowledge and other resources to share with our current students and recent graduates, in terms of mentoring, providing career advice, serving as role models, and making connections."

"We want students to be able to tap into these resources," he continues, "and this event is a way to facilitate networking, share knowledge, and showcase our most-accomplished alumni. But we feel that the new name of the conference better conveys the actual content and has helped us to generate student interest."

Cloud credits Janelle Konchar '06 and Khenya Still '07 with promoting the event among their ME classmates and also with playing a pivotal role in planning and carrying out the event. Of the 220 people who signed up for the event, more than 80 were students. "Janelle and Khenya did their jobs," says Conference Chair Jim Hutchison '78. "Making the program more focused helped attract more students. Our goal was to achieve a balance



Student members of the Planning Committee, Janelle Konchar and Khenya Still.

with a wide variety of seminars."

"It took someone like Jim [Hutchison] to have the vision and put in the time to make this happen," says Cloud. "He sees that there is so much potential for interaction between the engineering community and the University."

The dual-session program was an effective route to the goal of balanced offerings. Track A, *Business and Technology*, was geared toward alumni with several years of work experience, while Track B, *Career Planning*, was aimed at current students and recent grads. However, attendees were encouraged to craft a program meeting their own needs by either staying in a single track or crossing from one to the other.

"Why didn't I come last year?" asked one satisfied attendee. For those who didn't attend this year—plan to come next year. And in the meantime, you can read about what you missed in this issue of *ME News*.



Planning Committee

Track A: Business and Technology

Strategic Planning: Managing Business Success

Bill Mavity '72 is President and CEO of Paracor Medical, a company focused on developing device-based treatments for patients suffering from heart failure. He spent the first 21 years of his career with the 3M Company and the next 12 with a number of smaller companies.

While a strategic plan is commonly referred to as a "road map," a more correct analogy, according to Mavity, is "total trip planning." Questions to be asked include Where do we want to go and why? Can we access appropriate means of travel? Who else is trying to get there? What are alternative routes? At the end of the journey, is the trip worth taking? Can we apply the process to our next trip?

The strategy chosen will vary according to the size and position of the company. "Strategic planning defines the opportunity," said Mavity, "and answers the question 'What sandbox are we going to play in?'" Important elements of the process include identifying resources and assessing the competition.



William Mavity, President and CEO of Paracor Medical.

Mavity's experience, in addition to his work for major corporations, includes launching a start-up company based on the development of a new laparoscopic access device. He entered a \$300 million market dominated by two billion-dollar companies, with a product that offered some attractive features, including less risk, time savings, and better healing.

"We had to achieve profitability with less than a 10% market share," Mavity

Financial Planning: Tools for Business Management



Jodie Morgan, President of SPI Polyols.

With her wry sense of humor, **Jodie Morgan** '85, President of SPI Polyols, came to the conference to convince

said. He succeeded in the face of high risk and stiff competition.

"Mavity is a very successful person," says Hutchison. "He was very modest in his presentation, but he launched a start-up that did exactly what he set out to do, and now he's doing it again. His topic was strategic planning, but I think his personal story is what's really interesting."

At least one attendee agreed, commenting, "Insights relative to the presenter's

mechanical engineers that they need to get comfortable with financial statements.

"A degree in mechanical engineering provides a good analytical foundation that can be leveraged," she said. "Adding knowledge of finance greatly improves your career opportunities."

"An engineering education opens doors, gives you credibility, and provides technical knowledge and problem-solving skills," she continued. "But money impacts all decisions in business. The language of finance is a bridge between business functions and will increase your credibility."

Morgan came to that realization as an engineer, when some of the products she designed didn't make it past the design stage for financial reasons. "I wanted to close that gap for myself," she said. "I realized that being educated in finance would enable me to navigate between the disciplines."

own business were the most interesting and helpful." Mavity was referred to as "fascinating" and "clearly an expert with vast experience." Another participant said, "He really makes you think."

A self-professed mediocre student while at UD, Mavity found success after graduating by having a firm strategy and carrying it out. His advice on this topic was apparently taken to heart by at least one attendee, who said, "It's time to re-evaluate my strategic plan."

Part of Morgan's goal in speaking to the ME audience was to demystify financial documents, such as balance sheets and cash flow statements, which can be as daunting as reading a story written in another language. "It is like learning a second language," she admitted.

But according to Morgan, learning this second language doesn't require a major change in the undergraduate curriculum, nor does it mean that every ME grad should go on to earn an MBA. Seminars, short courses, and on-the-job training can provide an effective financial education with a relatively minimal time investment.

One participant summed up the effectiveness of Morgan's talk: "This subject should be made mandatory for all engineering students... an excellent, relevant message that the presenter packaged and communicated in a concise, effective manner."

Sustainable Energy

ME Professor **Ajay Prasad** provided a comprehensive overview of sustainable energy, with one attendee referring to his presentation as "a good laymen's primer on fuel cells and wind power."

"We always find that our alumni respond very positively to Ajay's style," said Hutchison. "They're amazed at how well he speaks to a lay audience."

According to Prasad, sustainable energy is hot news because of two pervasive concerns: (1) energy security and (2) environmental issues, including global warming and greenhouse gases. Fuel cells and wind energy are potential solutions to these problems.

Prasad used statistics about vehicle travel, oil prices and consumption, and vehicle size, performance, and fuel economy as support for the validity of these concerns.

Fuel cells, which combine fuel and oxidants electrochemically to produce electricity, are two to three times more efficient than internal combustion engines. "A fuel cell stack is quiet, has no moving parts, and



Ajay Prasad, Professor of Mechanical Engineering.

produces zero emissions," he said.

Several companies, including Honda, Toyota, and GM, have developed concept vehicles based on fuel cell technology, and fuel-cell buses are actually on the streets of some European cities. In addition to powering vehicles, fuel cells can be used for stationary power in such applications as telecommunications, small businesses, and residences, as well as provide portable power for laptops and other small electronics.

At UD, fuel cell research has taken several directions, with ongoing projects addressing water management, fluid transport, durability, and materials characterization. In addition, ME is collaborating with other research groups in the University of Delaware Fuel Cell Bus Program. The goal of this project, funded by the Federal Transit Administration and carried out in collaboration with a consortium, is to research, build, and demonstrate a fuel-cell-powered transit vehicle in Delaware.

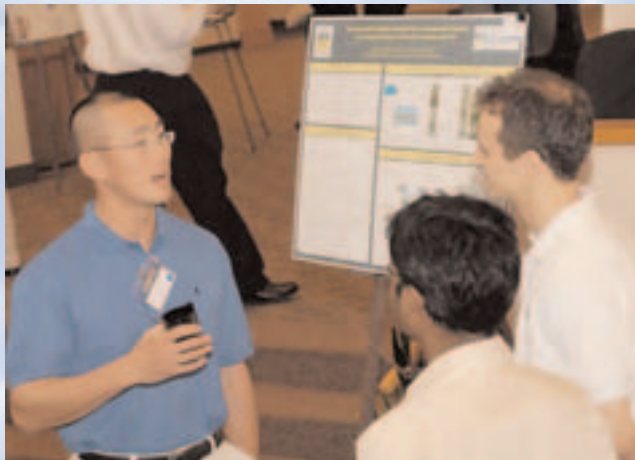
Prasad also provided an overview of wind energy efforts throughout the world, including the Jersey-Atlantic Wind Farm in Atlantic City, which is the first coastal wind farm in the United States, and Cape Wind, located offshore on Nantucket Sound.

At UD, wind energy research is multifaceted, focusing on composites manufacturing and structural testing, experimental and computational fluid mechanics, vibrations and control, and resource assessment.

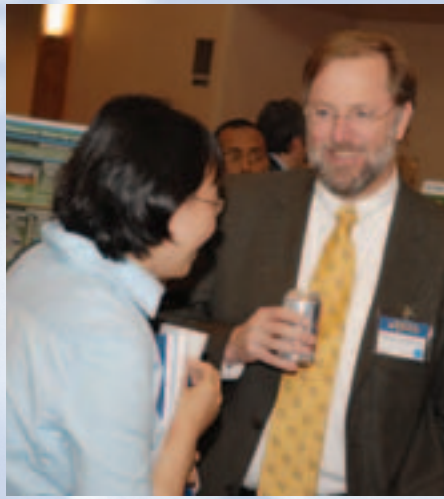
Prasad's presentation ended, appropriately, with a slide featuring Earth Day 2006, which had taken place just a week before the ME Conference.



The Day



in Photos



Track B: Career Planning

Engineering Your Future: Starting/Improving Your Career

Marie DiDaniels, R&D Human Resources Manager at Dade Behring, got high marks for providing an interesting and informative seminar for students and other potential job seekers. “It was a very good treatise on an important subject,” said one attendee. “She gave good advice, including information on interviews and etiquette,” commented another.

The presentation included tips on writing effective resumes, information about the various types of interviews companies

typically use, and resources for job hunters. DiDaniels urged interviewees to research prospective employers and ask good questions. “It’s a good way to differentiate yourself from the competition,” she said.

“This is a major life decision,” she continued. “Don’t take a job just on the basis of the money. The personality of the job is very important, and the culture of companies varies a lot.”

A lively discussion followed the presentation, with participants not only asking questions but also sharing their insights and experience with each other. One valuable resource in the audience was Alex Bourdon ’80, Vice President of Global Manufacturing for Dade Behring.

At the 2005 alumni conference, Bourdon was a formal presenter. This year, he shared his experiences informal-



Marie DiDaniels, R&D Human Resources Manager at Dade Behring.

ly. His main message: Show interest in and knowledge about the company during an interview, and accept the position only if you feel it will be a good fit.

Navigating Your Career Path: Stepping Up to Leadership



Terri Kelly, CEO of W.L. Gore and Associate.

Terri Kelly ’83, CEO of W.L. Gore and Associates, opened with some back-

ground on Gore, where she has spent her entire career, and then shared her key learnings and reflections with the audience.

“You learn a lot being thrown into a crisis,” she said. “You will surprise yourself regarding what you can achieve. As an engineer, almost all career paths are open to you.”

“Tap into the resources and the expertise available to you,” she continued.

Meeting your commitments and operating with integrity is crucial.”

However, Kelly cautioned that while an engineering background provides a grounding in applying good science and effective problem solving, it’s not enough.

“People skills do matter and do impact your effectiveness,” she said. “Being an

effective leader requires different skills. Taking control of your own career and development path is important... and a little luck doesn’t hurt!”

Kelly showed a video of ME grads who commented on what they originally thought they would do with their degrees, what they started off doing right after graduation, and what they’re actually doing several years into their careers. Many are working in customer relations, some are in strategic sales, while still others are doing straight engineering. “The talk really demonstrated the breadth of mechanical engineering,” said Konchar.

One attendee referred to Kelly’s presentation as “awesome,” while another credited her with having an “excellent approachable style.” A third participant found the details of her transition from engineer to CEO “most interesting.”

Diverse Road Maps to Success: Panel Discussion

Moderated by senior Janelle Konchar, this panel discussion presented the points of view of six young ME alumni. The career paths of the panelists covered a broad range of areas, including land development and home-building, the chemical industry, the entertainment industry, equipment and process optimization, and architectural management. The sixth participant was a current master’s degree candidate.



Janelle Konchar, Panel Moderator

“The fact that the session was organized and run by students was viewed as a real plus,” said Cloud. “Attendees seemed to feel that the session complemented the other presentations well, both in format and in content.”

Pat Reynolds ’67, co-founder, President, and CEO of PoolPak Technologies Corporation, was very impressed with the panel discussion. “From the start of the session, Janelle set the course with her lead-off questions,” he said, “addressing what to expect during the first couple of years in the work world and in graduate school.

This topic is probably on the mind of every senior. I know it was on my mind when I was a senior—and even a junior. Unfortunately, my peers and professors couldn't shed light on this subject."

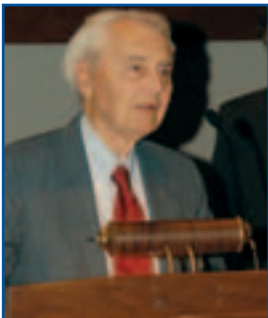
"The panelists addressed the expectations they thought their employers had," he continued, "and shared their nervousness that they might not live up to these expectations. As the graduates moved from job to job, some learned what they didn't want to do, and others found things they liked to do. I think these mini-war stories gave a lot of insight into what life would be like on the other side of the diploma."



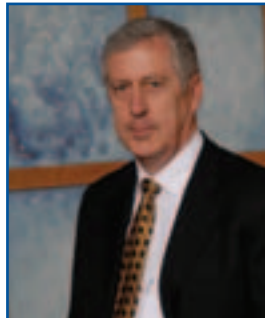
Panel members from left: Brian Zigmund (1999), Allison Bruton (2004), Rob Allen (2000), Katherine Piazza-Thuma (2002), and David Geesaman (2000). Not pictured is Kirsten Huesmann (2003).

Distinguished Career Alumni Presentations

After dinner, five alumni were honored for their distinguished careers:



Carl Hall '50, Dean Emeritus and Professor Emeritus, Washington State University



William Mavity '72, President, CEO, and Director of Paracor Medical, Inc.



Terri Kelly '83, President and CEO of W. L. Gore & Associates, Inc.



Alan Flenner '86, attorney with High, Swartz, Roberts & Seidel and Commander, Navy Reserve Civil Engineer Corps.



Kaushal Kurapati '95, Senior Product Manager at Ask Jeeves, Inc.



Keynote Address: Returning to Flight

Dr. Jerry Kegelman '78, Deputy Director for Research and Technology Test Operations at NASA-Langley, spoke about the Space Shuttle Program following the Columbia disaster.

Unraveling the mystery of the Columbia accident was a lot like solving a criminal case, and, as with any forensic investigation, it involved a lot of repetitive, time-consuming, and tedious work.

Starting with a tribute to the seven astronauts who lost their lives in the accident, Kegelman said "This is always emotional for me, we either knew them personally or were 'one degree away'. That's why we work so hard to get it right."

"The search crews had to look for debris over a 2,000-square-mile area in Texas," Kegelman said. "The swath was four times as long as the state of Delaware." Team members combed the area, walking side-by-side six feet apart, through the east Texas wilderness, including swamps and thorny forests, collecting small pieces of the shuttle that might provide clues to the disaster.

That was a tedious, but essential, part of the investigation. The high-tech part involved many engineering disciplines, including wind-tunnel testing, computational fluid dynamics, stereo lithography, impact dynamics testing, and non-destructive evaluation to name a few. As Columbia was the first shuttle built, the ship had extensive instrumentation, including an on-board data recorder that enabled the team to decode key data about the vehicle.

Information from all of these sources was pieced together to show that the cause of the shuttle's failure was a chunk of insulating foam that separated from the external tank and struck the wing. It may seem unlikely that a 1.67-pound piece of foam could do so much damage, but Kegelman pointed out that with the vehicle traveling at Mach 2.46, the foam struck the wing at about 550 MPH, which has the same kinetic energy as a 167-pound object at 55 MPH!

Solving the technical mystery, however, was only the beginning. "The Agency had to ask, 'What do we do for the next time?'" Kegelman said. "We don't want to talk ourselves into flying again without really knowing what went wrong and why."



Jerry Kegelman, Deputy Director for Research and Technology Test Operations at NASA-Langley.

So NASA created the Engineering and Safety Center at Langley, which began to address the root physics issues that can determine whether or not a mission is safe. "Since then," said Kegelman, "we've solved a number of challenging problems. For example we've characterized the fracture mechanics of pieces on the shuttle, put that information into structural mechanics models, and now can accurately simulate the impact of foam on the leading edge."

When Mission 114 was launched last summer, and foam unfortunately came off during that flight as well, NASA began "rethinking foam from the ground up," said Kegelman. Recent investigations show that most of the foam at a thickness up to two inches is "fairly well behaved," but when extra foam is sprayed on for insulation or aerodynamic fairing, temperature gradients can cause cracking.

"We've become much smarter since the Columbia flight," Kegelman said. "The Agency has learned to simulate any number of 'curve balls' that might occur during a flight, using all of its resources to quickly figure out what's going on. Even before a flight we rehearse the process of quickly developing answers to questions."

The space shuttle will be retired in 2010 and replaced with the Crew Exploration Vehicle and a Crew Launch Vehicle. "While this may look like Apollo, it will be like Apollo on steroids," Kegelman said, "carrying up to six astronauts and orbiting the moon for up to six months at a time." The plans for the new vehicles are part of the new "Vision for Space Exploration."

As captivating as Kegelman's keynote address was, it would be diffi-

cult to top his personal story. He is one of 10 children, nine of whom graduated from the University of Delaware. And they all paid their own way through school.

Tom started at UD but finished at York with a degree in biology. The nine UD degrees include John, computer science; Matthew, physics; Jerry, mechanical engineering; Joe, electrical engineering; Mary, art; Christine, journalism; Bernadette, biology; Jim, mechanical engineering; and Dan, math.

Not only did the family grow up in Delaware and go to UD, but nine out of the ten never left Delaware—all but Jerry still live in the First State. Six family members (four of his brothers, one of his sisters and her husband, and his father) reunited at the ME celebration to hear Jerry's talk.

His mother missed the event because she was out of town. But she had a good excuse, according to Jerry's brother Jim, who works for Dade Behring in Glasgow. Named Delaware Mother of the Year (MOY) and National MOY in 2004, she still has speaking obligations.

In addition to raising her own 10 children, Mary Kegelman touched the lives of thousands of other children through her work as a math teacher. In an interview about the MOY award, family friend Nancy Keiper said of Mary Kegelman, "All of her kids have done well—they have all gone on to accomplished careers as teachers, scientists, and computer experts."

Jerry Kegelman's personal success story is one chapter in what is obviously a family success story. "We all owe everything to our parents," said Jim. "They are not only well educated but also very nice people who are very humble."

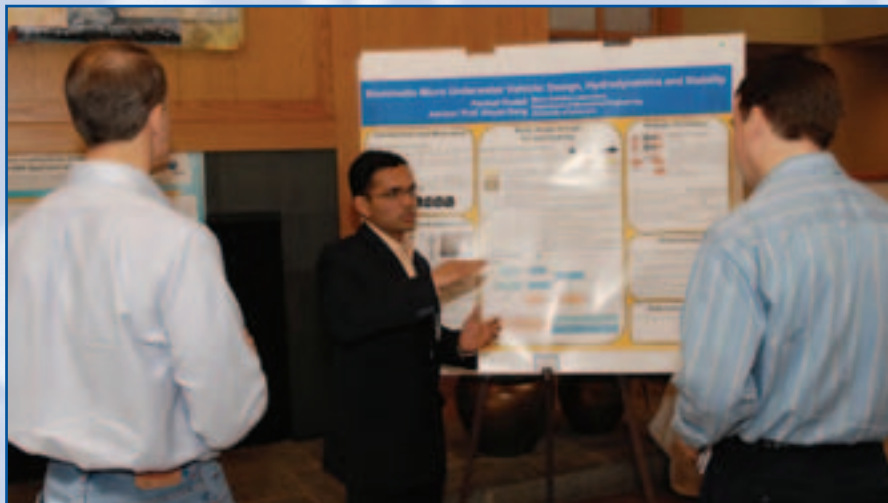


Kegelman Family: front row from left, Christine, Matt (dad), Jerry; back row from left Matthew. Not pictured are Mary (mom who was out-of-town), John, Joe, Tom, Mary, and Bernadette.

The Extras: Networking, Posters, and Resume Book

In between the formal seminars, participants had the opportunity to peruse the Mechanical Engineering Research and Technology Displays and network with other attendees. A resume book, including resumes of any interested students and alumni, was distributed to all event participants.

The Research and Technology Displays featured posters on selected research projects in the department, including work in composites and materials, clean energy and fuel cells, biomedical engineering, and robotics and controls. The work was displayed by graduate and undergraduate students of the department.



Attendees at poster session.

And...the Wrap-up

“We had a number of goals for this event,” said Cloud. “We wanted to recognize alumni for their career achievement and impact and to celebrate unique and interesting alumni careers.”

“We also wanted to offer educational opportunities to alumni and students regarding current business and technology topics and career strategies,” he continues, “and, at the same time, provide an annual networking event to expand career opportunities for alumni and recruiting for students.”

“Finally, the event is a way for alumni to stay in touch with Mechanical Engineering faculty and current happenings at the University. I think we were able to do all of these things with this year’s conference, but we’re always looking for feedback, and we welcome ideas for how we can do better in the future.”

“We’re very grateful for the support of Dean Eric Kaler and ME Chair Tom Buchanan,” Hutchison said. “We also couldn’t have organized and hosted this event without the support of the Planning Committee and the ME staff.”

Darlene Gorton ’96, now with Gore, stopped by Clayton Hall after work to reunite with fellow ME alums at the conference and learn about what is going on in the department. Gorton also had a mini-reunion with a high school classmate: She and Assistant Professor Jill Higginson were classmates at Pennsbury High School in Fairless Hills, Pennsylvania.

You never know who you’re going to meet at the annual ME conference, but it’s definitely worth attending....

Research and Technology Displays

Experimental Investigation of Liquid Water Formation and Transport in a Transparent Operational PEM Fuel Cell, Dusan Spornjak (advised by S.G. Advani and A.K. Prasad)

Turbulent Collision-Coalescence of Cloud Droplets: A Hybrid DNS Approach and Results, Orlando Ayala and Bogdan Rosa (advised by W.W. Grabowski and L-P. Wang)

Growth of Cloud Droplets by Turbulent Collision-Coalescence, Yan Xue (advised by L.P. Wang and W.W. Grabowski)

Modeling and Simulation of Leukocyte (WBC) Transmigration Through Cellular Junctions in Inflammatory Responses, Xiaoyi Li (advised by K. Sarkar)

Finite Deformation Study on Fibril-Reinforced Poroelastic Model of

Articular Cartilage, Fulin Lei (advised by A. Szeri)

The Characterization of High Performance Nano-Composites for Orthopedic Applications, Allison Bruton (advised by M.H. Santare and S.G. Advani)

Microcrack Damage and its Effect on Stress Wave Propagation, Dan Su (advised by M.H. Santare)

Design and Hydrodynamics of a Biomimetic Micro Underwater Vehicle, Parasar Kodati (advised by X. Deng)

Characterization of Muscle Power Outputs as a Result of Wearing Polypropylene Ankle Foot Orthoses (AFOS) Using 2-D Musculoskeletal Gait, Charles Crabtree (advised by J.S. Higginson)

Non-Uniform Musculotendinous Finite Strain Fields in the Supraspinatus During Shoulder Elevation, Hehe Zhou (advised by J.E. Novotny)

Experimental Investigations on Capillarity Driven Flows Through Porous Media, Valentin Neascu (advised by S.G. Advani)

Molecular Dynamics Simulation of Liquid Argon Flow Around a Carbon Nanotube, Wenzhong Tang (advised by S.G. Advani)

Rheological Behavior of Multi-Walled Carbon Nanotube Suspensions, Zhihang Fan (advised by S.G. Advani)

Experimental Investigation of Liquid Water Formation and Transport in a Transparent Polymer Electrolyte Membrane Fuel Cell, Dusan Spornjak (advised by S.G. Advani and A.K. Prasad)

Durability of PEM Fuel Cell Membranes, Yaliang Tang and Ahmet Kusoglu (advised by A.M. Karlsson and M.H. Santare)

Direct Methanol Fuel Cell for Multifunctional Composites, Srikanth Arisetty (advised by A.K. Prasad and S.G. Advani)

Kinking from Bimaterial Interface Crack: Effect of Residual Stresses, Arun Agrawal (advised by A.M. Karlsson)

Analytic Characterization of the Permeability of Dual-Scale Fibrous Porous Media, Fuping Zhou (advised by S.G. Advani)

Real Time Gait Event Detection From Knee Brace Integrated Sensors, Andrew Davison and Jo White (advised by J-Q Sun)

A New Port Injection Process for Improved VARTM Resin Flow Control, Mike Fuqua (advised by J.L. Glancey)

Mathematical Modeling and Testing of a New Polymer-Based Impact Tool Design to Reduce Vibration-Related Biomechanical Injuries, Janelle Konchar (advised by J.L. Glancey)



Awards

HONORS DAY MECHANICAL ENGINEERING AWARD RECIPIENTS MAY 5, 2006

SENIOR YEAR AWARDS:

W. FRANCIS LINDELL MECHANICAL
ENGINEERING AWARD TO THE
DISTINGUISHED SENIOR

**Douglas A. Brunner
Kristen M. Elli
Janelle A. Konchar**

MARY AND GEORGE NOWINSKI AWARD FOR
EXCELLENCE IN UNDERGRADUATE
RESEARCH

Daniela Wagus

JUNIOR YEAR AWARDS:

W. FRANCIS LINDELL MECHANICAL
ENGINEERING AWARD TO THE
DISTINGUISHED JUNIOR

**Hadi M. Fattah
Christopher T. Sherman**

W. FRANCIS LINDELL MECHANICAL
ENGINEERING ACHIEVEMENT AWARD

**Andrew N. Seagraves
Joshua D. Treisner**

SOPHOMORE YEAR AWARD:

W.J. RENTON AWARD FOR OUTSTANDING
SOPHOMORE

Benjamin I. Binder Macleod

OTHER DEPARTMENT AWARDS:

DELAWARE SECTION OF THE AMERICAN
SOCIETY OF MECHANICAL ENGINEERS
OUTSTANDING STUDENT

Michael A. Zeitz

AMERICAN SOCIETY OF MECHANICAL
ENGINEERS STUDENT SECTION

Michael A. Fuqua

ROBERT T. BOSWORTH SCHOLARSHIP

Matthew B. Jaskot

REDDEN SCHOLARSHIP

**Jessica A. Dibelka
Christopher T. Sherman
Janessa N. Smith**

HELWIG GRADUATE FELLOWSHIP

**Darren A. Brown
Debra Grace George**

NEWMAN FUND SCHOLARSHIP

**Karol Grabczewski
Matthew D. Griffith**

Debbie George Wins the 2006 Laird Fellowship

Although gymnastics, mechanical engineering, and ceramics may seem to have little in common, they are all outlets for Debbie George's creativity and passionate nature. Winner of the 2006 Laird Fellowship, George is a Ph.D. candidate advised by ME Assistant Professor Jill Higginson.

It was actually a phone call from Higginson that persuaded George to come to Delaware. Originally from the Philadelphia area, she earned her bachelor's degree at Cornell University.

"I think the classes at most good schools are pretty much the same," George says. "I came here for the research. I had been accepted at several schools, but when Dr. Higginson called me and described her research program, it was easy to make a decision."

George had already developed a strong interest in biomechanics as an undergraduate at Cornell, where she did research during her junior and senior years. Higginson's study of gait mechanics in stroke patients intrigued her.

The work involves the use of muscle stimulation, for both rehabilitation and "maintenance"—for the latter application,

the stimulation becomes a kind of pace-maker for the muscles, taking over where the natural stimulation of the brain is impaired. "After I finish my Ph.D., I want to work on products that will directly benefit a group of people, such as stroke patients," George says.

While she is an outstanding student, George had to be more than that to win the Laird Fellowship. Established 25 years ago in honor of George W. Laird, the Fellowship is given annually to a graduate student in engineering "to encourage the recipient to become engaged in a broadening intellectual pursuit that may or may not be of direct application to the recipient's chosen field of study."

In Debbie George's case, the focus of that broadening pursuit is pottery. Interested in manipulating clay since she was a young child, George took ceramics courses in high school and at Cornell. She has continued her passion as a graduate student, taking a course at a community college.

But the Laird Fellowship will enable George to do two things that she would not otherwise have been able to do: have convenient access to ceramics facilities and become a better potter by studying the work of masters. She plans to use the money to open a pottery studio where she will not only have unlimited time to work on her own pieces but also offer other members of the community the opportunity to work. In addition, she plans to

travel to Spain during the summer of 2007 to learn from the teachers in that country, improving her own work and enabling her to share what she knows with others.

"The trip will give me a new perspective and new techniques to cultivate and enrich my abilities to express myself creatively," she says. It will also enable me to offer my acquired knowledge to anyone in my pottery studio who wants to learn."

Although Laird's untimely death precluded his meeting the recipients of the Fellowship established in his name, he would undoubtedly approve. Over the past two decades, the funds have supported an exceptional group of "Renaissance" men and women with many diverse interests.

Deb George is no exception. A former competitive gymnast, a talented potter, and a promising biomechanics researcher, she is also an energetic volunteer and an accomplished baker. "All of these things have helped shape who I am as a person," she says, "and in turn, they will help shape my future."

"Debbie has been a wonderful addition to my research group," Higginson says. "Her self-motivation, inquisitive nature and charismatic personality enhance the lab atmosphere and make data collection sessions more fun. I expect Debbie will thrive here at UD and her future career (and ceramic) pursuits!"

Alumni News



Nicholas L. Grossman (BME2003) is a 40mm Mmunition Mechanical Engineer with U.S. Army RDECOM-ARDEC in Picatinny, NJ. Grossman was kind enough to pass along several pictures of his colleague, Timothy L. Jenkins (BME2003), who is with the U.S. Army and is currently deployed in Iraq.

Michael Stephen Quariadi, BME1995 MME2004, is working as a mechanical engineer for L-3 Communications Integrated Systems in Greenville, TX.

Gilbert Jon Stieglitz BSME1962 retired from the U.S. Army in 1992, after 30 years of active duty. He then joined CAS, Inc. as a Systems Engineer/Program Manager and was promoted to Vice President of the company's

Command and Control Group in 1999. He completed a master's degree in electrical engineering at the University of Texas–El Paso in 1971.

Obituaries

Michael A. Streicher, former Research Professor at the University of Delaware in the Department of Mechanical Engineering, died on February 14, 2006, at the age of 84. From 1949 to 1979, Streicher worked for the Engineering Department of the DuPont Company, where he advanced to the positions of Research Fellow and Principal Consultant. For the next eight years, he was on the UD-ME faculty. His students were the recipients of prominent industry awards. Thereafter, he worked as an independent consultant

with major attention devoted to safe storage containers for nuclear waste. Internationally recognized for his work on the testing and development of corrosion resistant stainless steel alloys, he was published widely in technical journals and textbooks and held numerous patents. He received several prestigious awards, including Fellow of the American Society for Metals (1970), the Willis Rodney Whitney Award from the National Association of Corrosion Engineers (1972), and Fellow of the International Association of Corrosion Engineers (1994). His many lifelong interests also included art, music, history, philosophy, and current events.

James Ridgeway Jones, age 78, of Elkton, MD, died on Tuesday, April 18, 2006, at Christiana Hospital in Newark, DE. A graduate of Seaford High School, he earned his degree in mechanical engineering at the University of Delaware. Jones served his country in the U.S. Army as a First Lieutenant with tours of duty in Korea and Alaska. In civilian life, he enjoyed a 32-year career with the Exxon Corporation and was posted with his family all over the world, including assignments in England, France, Argentina, Holland, Japan, Spain, Belgium, and Colombia. He retired in 1986.



ALUMNI FEEDBACK - What's New With You?

Do you have any feedback (comments, questions)? Or let us know any current events or info not covered by the data sheet below.

INFORMATION FORM FOR THE DEPARTMENT'S RECORDS

Name _____
First Middle Last Maiden

Delaware Degree BME Date _____ MME Date _____ Ph.D. Date _____

Spouse's Name _____ DE Alum? _____

Mailing Address _____

Home Phone _____ E-mail _____

Company _____ Your Position _____

Mailing Address _____

Business Phone _____ Fax _____

E-mail _____ Web Address _____

Please identify if your company is an affiliate or subsidiary of a larger company _____

Return this form to: Nate Cloud, 126 Spencer Lab, University of Delaware, Newark DE 19716 and/or contact me at cloud@me.udel.edu or 302-737-4111



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