

Fall 2006

The George Washington University
SYNERGY
School of Engineering & Applied Science

ANOUSHEH ANSARI:

Space Explorer, Businesswoman,
and Social Entrepreneur



First Words



"BUILDING PARTNERSHIPS
BETWEEN INVESTORS AND
RESEARCHERS IS THE
FUTURE OF RESEARCH
UNIVERSITIES, AND SEAS
IS TAPPING INTO THIS."

FROM THE DEAN: Timothy W. Tong

I am delighted to send you this issue of *Synergy* magazine and update you on what is happening at SEAS. During the past year, we have been busy with a number of new initiatives that we hope will advance the School, its prestige, and its relationship with alumni, research partners, business partners, and others.

Our most recent initiative is our newly established Engineering Hall of Fame. Many of our alumni have inspiring stories to tell and have achieved great professional success over the course of their careers. We want to be able not only to honor them and their successes but to capture their stories to motivate our current students. The Hall of Fame is a great way to be able to do both, and we are thrilled to have inducted our first round of members into it earlier this fall. I want to get the word out to our alumni community to encourage nominations. SEAS has many, many alumni/ae who have made significant contributions to engineering and the applied sciences, and we would love to be able to honor them.

A second—and very big—initiative is CET2C, the Council of Entrepreneurial Tech Transfer and Commercialization, which we officially launched earlier this year. We formed CET2C to promote technology transfer at SEAS, and there is already a tremendous amount of interest in the Council and its activities. I am especially glad to promote CET2C, because it can have an enormously positive impact on the School. Building partnerships between investors and researchers is the future of research universities, and SEAS is tapping into this and building our own infrastructure to facilitate these partnerships.

Solid research clearly precedes any attempts to build a technology transfer infrastructure, and SEAS has had a number of recent successes. Our faculty have done very well in winning competitive research grants from prestigious organizations such as the National Institutes of Health, the Sloan Foundation, and the Walter H. Coulter Foundation. To find out more about these research activities, please turn to pages 19-21.

I am proud of our initiatives and successes, and I hope you will enjoy reading our good news as much as I enjoy sharing it with you.

Sincerely,

A handwritten signature in black ink, appearing to read "Timothy W. Tong". The signature is fluid and cursive, with a large, sweeping "T" and a long, horizontal stroke at the end.

Timothy W. Tong
Dean



SYNERGY

FALL 2006

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AND AEROSPACE ENGINEERING**
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PROFILE

Chair: Kim Roddis
202-994-4901
www.cee.seas.gwu.edu
Full-time faculty: 12
Undergraduate students: 58
Graduate students: 62
Annual research expenditures:
\$2.6 million

FACULTY

Sameh S. Badie, **ASSISTANT PROFESSOR**
Kennerly H. Digges, **RESEARCH PROFESSOR**
Azim Eskandarian, **PROFESSOR**
Muhammad I. Haque, **PROFESSOR**
Ding-Dao (Steve) Kan, **ASSOCIATE RESEARCH PROFESSOR**
Khalid Mahmood, **PROFESSOR**
Majid T. Manzari, **PROFESSOR**
Dhafer Marzougui, **ASSISTANT RESEARCH PROFESSOR**
Vahid Motevalli, **ASSOCIATE PROFESSOR**
Kim Roddis, **PROFESSOR**
Rumana Riffat, **ASSOCIATE PROFESSOR**
Pedro Silva, **ASSOCIATE PROFESSOR**

RESEARCH AREAS

ENVIRONMENTAL ENGINEERING/BIOSYSTEMS ENGINEERING
Riffat

GEOTECHNICAL ENGINEERING/EARTHQUAKE ENGINEERING
Badie, Manzari, Roddis, Silva

STRUCTURAL ENGINEERING
Badie, Manzari, Roddis, Silva

TRANSPORTATION SAFETY ENGINEERING
Digges, Eskandarian, Kan, Marzougui, Motevalli

INTELLIGENT TRANSPORTATION SYSTEMS
Eskandarian

It's a Bit Like Legos

The method isn't new. In fact, Europe and Japan used it to reconstruct their cities and bridges after World War II. The method is precast concrete construction, and according to Professor Sameh Badie of the Department of Civil and Environmental Engineering, "It's a bit like Lego pieces that you place together."

Badie, a recognized expert in precast concrete bridge deck systems, explains the advantages of precast construction over the cast-in-place (CIP) construction system that the U.S. has long used in bridge decks. "Contrary to CIP concrete deck slabs that involve building wood forms, installing reinforcements, casting and curing concrete, and stripping the forms—all on site—precast concrete bridge deck panels are fabricated off-site, under controlled conditions, and brought to the job location ready to install in pieces that connect together. Precast construction is initially more expensive than CIP construction, but ultimately it's cheaper because construction is quicker and future maintenance time and costs are lower. Therefore, disruptions to traffic and bridge closures are significantly reduced, and safety is improved because more of the work is moved out of the way of traffic."

As part of its effort to encourage state highway agencies to move to precast construction, the Federal Highway Administration and the Transportation Research Board (TRB) began providing grants to research institutions in the 1990s to develop, test, and promote new precast technologies. And that's where Badie comes in.

Over the last ten years, Badie has been involved in a number of national research projects to develop these technologies. "I hold a patent for the NUDECK, a new bridge deck panel system that was implemented in Omaha, Nebraska, in 2004 and 2005," says Badie. "Also, working jointly with a group of researchers at the University of Nebraska, we developed a large steel stud that can replace two of the traditional studs used to connect a bridge deck with the supporting beams. It saves on both labor and material costs, because now the welder needs to weld only 50 studs instead of 100." In addition to a number of research projects he participated in before joining The George Washington University, Badie received a highly competitive, four-year, \$400,000 grant from the TRB's National Cooperative Highway Research Program in 2003. The purpose of the grant is to develop new connection details between the precast deck panels and the supporting beams.

According to the U.S. National Bridge Inventory, approximately 30 percent of America's highway bridges are structurally or functionally deficient. With this much work to be done, Sameh Badie's expertise will certainly play a role in helping to restore the aging U.S. highway system.



SPANNING THE FIELD: Professor Sameh Badie's research spans across a number of bridge technologies.



ALGORITHMS: Professor Xiuzhen Cheng develops algorithms to extend the lifetime of wireless sensor networks.

The Key to Her Success

"Some people find algorithms pretty tedious, but I enjoy them," says Professor Xiuzhen Cheng of the Department of Computer Science. "When you come up with a good algorithm you feel really good, because your algorithm is better than the others. At that time, yours is the best, but two months later someone else comes up with another result and yours is no longer the best."

Cheng clearly enjoys the challenge of her research, and the challenge of competition. And it's no wonder when one considers her career successes. In 2004, the National Science Foundation awarded Cheng one of its very prestigious CAREER Awards. All junior faculty at American universities can apply for the awards, but only about 20 percent of the proposals are funded. In Cheng's case, she received \$427,000 to conduct research over a five-year period.

Her research covers three broad areas—wireless networking, wireless and mobile security, and medical computing—but she continues to focus her efforts primarily on wireless sensor networking. The central task in the wireless networking world is to conserve energy to extend the network's lifetime, and Cheng is developing algorithms to do just that.

"Sensors are usually powered by a double-A battery, and in many applications, the batteries can't be charged or replaced after the sensors are deployed," says Cheng. "Basically, an always-on sensor will work for only a month, in the best-case scenario. Networks are deployed for monitoring and control, and in most cases we want them to work for many years, so we need a special design to make sure that the network lifetime can be much, much longer. Batteries can be replaced in a laboratory, but in a large-scale system deployed for habitat monitoring or the battlefield, you can't replace the batteries. When you run out of batteries, the sensor dies." Given the applications of wireless networks—which include monitoring roadway safety and hazards, forest fires and wildlife, earthquake activity, pollution and chemical spills, search and rescue operations, and more—this is obviously critical.

While she is quick to point out that the efforts of her team are just a small part of this large research field, Cheng is proud of the unique contributions she and her students have made. Their localization algorithm is different from all other existing algorithms in that it does not require the sensors to do anything except passively receive commands, thereby conserving energy and avoiding the need for system centralization. Another accomplishment is pre-key distribution. Says Cheng, "Others are doing key management before deployment, but there are lots of restrictions to pre-deployment management. We are the only ones doing research in post-deployment key management, and our result is pretty attractive. Our algorithm performs many times better than others, and it can make sure that the system has much stronger security and stronger resilience against different types of attacks."

PROFILE

Chair: James K. Hahn
202-994-7181
www.cs.gwu.edu
Full-time faculty: 21
Undergraduate students: 123
Graduate students: 359
Annual research expenditures: \$3.3 million

FACULTY

Abdelghani Bellaachia, **ASSOCIATE PROFESSOR**
Simon Berkovich, **PROFESSOR**
Peter Bock, **PROFESSOR**
Xiuchen "Susan" Cheng, **ASSISTANT PROFESSOR**
Hyeong-Ah Choi, **PROFESSOR**
Michael B. Feldman, **PROFESSOR**
Liliana Florea, **ASSISTANT PROFESSOR**
James K. Hahn, **PROFESSOR**
Rachelle S. Heller, **PROFESSOR**
Lance J. Hoffman, **DISTINGUISHED RESEARCH PROFESSOR**
AND ACM FELLOW
C. Dianne Martin, **PROFESSOR AND ACM FELLOW**
W. Douglas Maurer, **PROFESSOR**
Sead Muftic, **RESEARCH PROFESSOR**
Bagharith Narahari, **PROFESSOR**
Rhys Price Jones, **PROFESSOR**
Shmuel Rotenstreich, **ASSOCIATE PROFESSOR**
John L. Sibert, **PROFESSOR**
Rahul Simha, **PROFESSOR**
Jonathon R. Stanton, **ASSISTANT PROFESSOR**
Poorvi Vora, **ASSISTANT PROFESSOR**
Abdou S. Youssef, **PROFESSOR**

RESEARCH AREAS

ALGORITHMS AND THEORY
Bellaachia, Berkovich, Cheng, Feldman, Price Jones, Maurer, Youssef

BIOINFORMATICS AND BIOMEDICAL COMPUTING
Bellaachia, Berkovich, Cheng, Florea, Hahn, Price Jones, Rotenstreich, Simha

COMPUTER SECURITY AND INFORMATION ASSURANCE
Hoffman, Martin, Muftic, Simha, Stanton, Vora

DIGITAL MEDIA
Hahn, Heller, Martin, Sibert

MACHINE INTELLIGENCE AND COGNITION
Bock

NETWORKING AND MOBILE COMPUTING
Cheng, Choi, Narahari, Rotenstreich, Simha, Stanton

PERVASIVE COMPUTING AND EMBEDDED SYSTEMS
Cheng, Narahari, Simha

SOFTWARE ENGINEERING AND SYSTEMS
Feldman, Maurer, Narahari, Rotenstreich

PROFILE

Chair: Can E. Korman
202-994-6083
www.ece.gwu.edu
Full-time faculty: 28
Undergraduate students: 168
Graduate students: 236
Annual research expenditures:
\$2.2 million

FACULTY

Shahrokh Ahmadi, **ASSISTANT RESEARCH PROFESSOR**
Nikitas A. Alexandridis, **PROFESSOR**
Lawrence Bennett, **RESEARCH PROFESSOR**
Robert L. Carroll, **PROFESSOR**
Edward Della Torre, **PROFESSOR AND IEEE FELLOW**
Milos Doroslovacki, **ASSOCIATE PROFESSOR**
Tarek A. El-Ghazawi, **PROFESSOR**
Kie-Bum Eom, **PROFESSOR**
Robert J. Harrington, **PROFESSOR AND IEEE FELLOW**
Hermann J. Helgert, **PROFESSOR**
Walter K. Kahn, **PROFESSOR AND IEEE FELLOW**
Matthew Kay, **ASSISTANT PROFESSOR**
Can E. Korman, **PROFESSOR**
Nicholas Kyriakopoulos, **PROFESSOR**
Roger H. Lang, **PROFESSOR AND IEEE FELLOW**
Ting N. Lee, **PROFESSOR**
Murray H. Loew, **PROFESSOR AND IEEE FELLOW**
Thomas J. Manuccia, **PROFESSOR**
David J. Nagel, **RESEARCH PROFESSOR**
Martha Pardavi-Horvath, **PROFESSOR**
Joseph N. Pelton, **RESEARCH PROFESSOR**
Debabrata Saha, **ASSOCIATE PROFESSOR**
Suresh Subramaniam, **ASSOCIATE PROFESSOR**
Branimir R. Vojcic, **PROFESSOR**
Wasył Wasyłkiwskyj, **PROFESSOR AND IEEE FELLOW**
Mona Zaghloul, **PROFESSOR AND IEEE FELLOW**
Jason M. Zara, **ASSISTANT PROFESSOR**
Vesna Zderic, **ASSISTANT PROFESSOR**

RESEARCH AREAS**BIOMEDICAL ENGINEERING**

Kay, Loew, Manuccia, Zara, Zderic

COMMUNICATIONS AND NETWORKS

Doroslovacki, Helgert, Pelton, Saha,
Subramaniam, Vojcic

COMPUTER ARCHITECTURE AND NETWORKING

Alexandridis, El-Ghazawi

ELECTROMAGNETICS

Bennett, Della Torre, Kahn, Korman, Lang,
Pardavi-Horvath, Wasyłkiwskyj

MICROELECTRONICS, VLSI SYSTEMS, AND MEMS

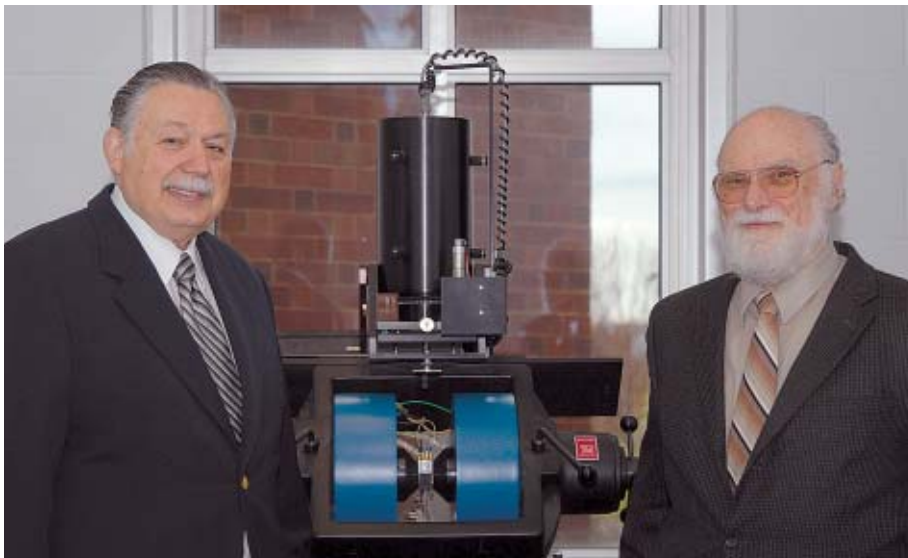
Ahmadi, Korman, Nagel, Zaghloul

MULTIMEDIA PROCESSING

Alexandridis, Eom, Loew

SIGNAL PROCESSING, SYSTEMS, AND CONTROLS

Carroll, Doroslovacki, Eom, Harrington,
Kyriakopoulos, Lee, Wasyłkiwskyj



QUANTUM LEAP: Professors Edward Della Torre (*left*) and Lawrence Bennett (*right*) use quantum statistics to explain a curious effect of magnetic nanoparticles.

Eureka: The Unexpected Discovery

The unexpected has a way of inserting itself into scientific inquiry. Take the case of Professors Edward Della Torre and Lawrence Bennett of the Department of Electrical and Computer Engineering. The two engineers were studying magnetic recording, and along the way they unexpectedly discovered a curious effect and found that it could be explained by applying quantum (Bose-Einstein) statistics.

Della Torre explains, "What you call a permanent magnet is not really permanent. So what do you do when you magnetize something and the magnetization doesn't last long enough? Well, what do you do if you don't want food to spoil? You put it in the refrigerator; you cool it down to slow the decay. So we took this magnetic material and we tried to slow it by cooling it down. But it doesn't slow the decay; it speeds it up."

Bennett continues, "If you plot the magnetization decay versus temperature, you expect it to go down as the temperature is reduced. We found that it came up to a peak. It then turned around and eventually went down to zero. But what made it come up? We discovered the reason. The ordinary theory, called the Arrhenius law, states that everything slows down as it cools down, but the Arrhenius law is based on classical thermodynamics. What we noted is that these magnetic materials should be described by quantum statistics. Everybody knew that but didn't pay attention to that fact. So we substituted quantum statistics for classical statistics and that was enough to explain the whole curve."

A practical application of this discovery is in computer hard drives, which are part of the multi-billion dollar magnetic recording industry. Engineers in the field of nano-magnetism are studying how to be able to store ever-increasing amounts of data on bits that are nano-particles—which are billionths of a meter in size. However, they believe that when a magnetic particle gets small enough, it does not remain magnetized very long, causing data to vanish.

Says Della Torre, "The magnets in hard drives effect whether the information on a hard drive will be stored for 10 minutes, 10 days, or 10 years, so it is important to both manufacturers and consumers to have a model that rapidly and accurately predicts how long a hard drive will last." Della Torre and Bennett believe that their discovery can help predict this unknown and improve the way the life cycle of computer hard drives is modeled. In addition, it may form a basis for the design of quantum computers.

Finding His Niche

"Maritime risk analysis is a niche," says Professor Johan Rene van Dorp of the Department of Engineering Management and Systems Engineering. "Over time we've developed the capability to do these maritime simulations, and others have not been able to replicate it yet. The most important factor in maintaining our position is for us to continue to be perceived as being independent."

Recent contract successes seem to indicate that they still maintain this reputation. In June of this year, British Petroleum West Coast Products (BP) awarded a consortium team, for which van Dorp is the principle investigator, an \$885,750 contract to conduct a detailed vessel traffic risk analysis in Washington State's Puget Sound. The study is part of a settlement agreement reached between the U.S. Army Corps of Engineers and Ocean Advocates, a local environmental monitoring group, regarding a BP oil refinery dock in the Sound. All the parties involved had to agree on a team to conduct the study, and they selected The George Washington University-led team, which includes Rensselaer Polytechnic Institute (RPI) and Virginia Commonwealth University (VCU) as sub-contractors.

Van Dorp describes maritime risk analysis as a three-stage process. "First, we re-create the operation of the port via a maritime simulation as accurately as we can. Then we develop a risk model on top of that; and then using the vessel traffic simulation and the risk model together we can calculate a baseline level of risk in the system as it is today. Then we can actually apply in the simulation the different interventions that stakeholders would like to implement and we can see what the effect is on the system-wide risk. Sometimes, we find that the intervention doesn't reduce risk, but, in fact, causes it to migrate through the system, creating unintended consequences. And I think that's our strength, that we have this system perspective."

As proof of the GWU/VCU/RPI team's success, van Dorp offers the following facts: as a result of their study in the Prince William Sound, a multi-million dollar escort vessel was purchased and is now permanently stationed there; an international safety management code in the Washington State ferry system has been introduced, in part, because of their risk assessment; and changes to the ferry routes in the San Francisco Bay are being made in line with the team's safety study and recommendations.

So, what's their secret? "Two sets of skills are necessary: quantitative analysis and expert analysis," explains van Dorp. "Tom Mazzuchi of SEAS, Jason Merrick of VCU, and I bring the quantitative analysis skills to the table. Jack Harrauld and Greg Shaw of SEAS, and Martha Grabowski of RPI bring subject matter expertise to the table, which allows us to really communicate with the Coast Guard and others. The interplay between the quantitative analysis experts and the subject matter experts is key to being able to do this kind of work."

THE RIGHT BALANCE: Professor Johan Rene van Dorp's maritime risk analysis team balances simulation and expert judgment elicitation skills.



PROFILE

Chair: Thomas A. Mazzuchi
202-994-7541

www.emse.gwu.edu

Full-time faculty: 21

Undergraduate students: 23

Graduate students: 688

Annual research expenditures: \$3.8 million

FACULTY

Hernan G. Abeledo, **ASSOCIATE PROFESSOR**
Abiodun Bada, **ASSISTANT PROFESSOR**
Joseph A. Barbera, **ASSOCIATE PROFESSOR**
Enrique Campos-Nanez, **ASSISTANT PROFESSOR**
Jonathan P. Deason, **PROFESSOR**
Michael R. Duffey, **ASSOCIATE PROFESSOR**
Howard Eisner, **DISTINGUISHED RESEARCH PROFESSOR**
AND IEEE FELLOW
Frank Fiedrich, **ASSISTANT PROFESSOR**
Gideon Frieder, **A. JAMES CLARK PROFESSOR**
AND PROFESSOR OF STATISTICS
Marvine P. Hamner, **ASSISTANT PROFESSOR**
John R. Harrauld, **PROFESSOR**
Theresa Jefferson, **ASSISTANT PROFESSOR**
Thomas A. Mazzuchi, **PROFESSOR**
E. Lile Murphree, **PROFESSOR**
Julie Ryan, **ASSISTANT PROFESSOR**
Shahram Sarkani, **PROFESSOR**
Richard M. Soland, **PROFESSOR**
Michael M. Stankosky, **PROFESSOR**
Rachuri Sudarsan, **RESEARCH PROFESSOR**
J. Rene van Dorp, **ASSOCIATE PROFESSOR**
Robert C. Waters, **PROFESSOR**

RESEARCH AREAS

CRISIS, EMERGENCY AND RISK MANAGEMENT
Barbera, Fiedrich, Harrauld, Mazzuchi, Sarkani, van Dorp

ENGINEERING AND TECHNOLOGY MANAGEMENT
Deason, Duffey, Eisner, Hamner, Jefferson, Murphree, Waters

ENVIRONMENTAL AND ENERGY MANAGEMENT
Deason, Harrauld

KNOWLEDGE AND INFORMATION MANAGEMENT
Bada, Frieder, Jefferson, Ryan, Stankosky

OPERATIONS RESEARCH
Abeledo, Campos-Nanez, Frieder, Mazzuchi, Soland

SYSTEMS ENGINEERING
Campos-Nanez, Duffey, Eisner, Mazzuchi, Sarkani, Stankosky, van Dorp

PROFILE

Chair: Michael K. Myers
202-994-9803
www.mae.seas.gwu.edu
Full-time faculty: 11
Undergraduate students: 120
Graduate students: 91
Annual research expenditures:
\$1.3 million

FACULTY

David F. Chichka, **ASSISTANT PROFESSOR**
Andrew D. Cutler, **PROFESSOR**
Charles A. Garriss, **PROFESSOR AND ASME FELLOW**
Roger E. Kaufman, **PROFESSOR**
James D. Lee, **PROFESSOR**
Kerr-Jia Lu, **ASSISTANT PROFESSOR**
Rajat Mittal, **PROFESSOR**
Michael K. Myers, **PROFESSOR**
Yin-Lin Shen, **PROFESSOR**
Timothy W. Tong, **PROFESSOR AND ASME FELLOW**
R. Ryan Vallance, **ASSOCIATE PROFESSOR**

RESEARCH AREAS

AEROSPACE ENGINEERING
Chichka, Cutler, Garriss, Myers

BIOMEDICAL ENGINEERING
Chichka, Kaufman, Lee, Mittal

**DESIGN AND MANUFACTURING OF MECHANICAL
AND AEROSPACE SYSTEMS**
Garriss, Kaufman, Lu, Shen, Vallance

FLUID MECHANICS, THERMAL SCIENCE, AND ENERGY
Cutler, Garriss, Mittal, Myers, Tong

SOLID MECHANICS AND MATERIALS SCIENCE
Lee



MEASURING SUPERSONIC FLAMES: Professor Andrew Cutler develops laser-method instrumentation.

Our Man with the Data

In the mid-1990s, NASA created the Hyper-X (X-43) Program in the hopes of developing scramjet propulsion systems that would be the next step in hypersonic research. Scramjet (supersonic combustion ramjet) engines use air from the atmosphere and run at hypersonic speeds. The dream of those who are working to develop this technology is that, using scramjets, they will be able to build something that looks like an airplane, takes off from a runway, and flies at hypersonic speed—thereby revolutionizing access to space.

However, before engineers can build prototypes to test this technology, they need to be able to calculate the gas flows through scramjet engines. They are trying to develop codes and software to do that, but these codes require physics-based mathematical models for turbulent mixing and turbulent combustion. And Professor Andrew Cutler of the Department of Mechanical and Aerospace Engineering has been quite successful in doing just that.

Cutler studies high-speed combustion and the fluid dynamics related to high-speed combustion, and he develops laser-method instrumentation to be able to measure gas flows. "My role is to acquire experimental data in engines or in simpler flows that have the same physics. People can then take this data to develop their models," says Cutler. "Part of the challenge is to develop the instrumentation to do that. You can't really use a probe to measure temperature, composition, or velocity because the probes will melt, so we develop laser methods."

NASA and its Langley Research Center have funded Cutler's work, and he believes that the work he's done with his collaborators there is unique. "There's no other group in the world, in my opinion, who has that type and quality and detail of measurements in a supersonic combustor," says Cutler. "That data is being used by computational fluid dynamics modelers around the world."

So how does Cutler view the contribution that his data make to hypersonic propulsion? "These models that are developed in part from our data are used in the codes that engineers use to design scramjet engines. Down the road, it's a small but critical part in the jigsaw puzzle of hypersonic aircraft technology. Maybe one day it will make a bit of difference in making access to space cheaper." He explains, "It would seem to be obvious in principle that if you can take oxygen from the air when you burn fuel as a scramjet does, instead of carrying the oxygen in tanks as a rocket does, that would be more efficient. But, you still have to make it work."

SEAS Promotes Tech Transfer

Universities have become "ground zero" for the new innovation economy, creating 400 start-up companies each year, and SEAS is taking its place in this new environment. In the spring 2006 semester, SEAS launched CET2C—the Council of Entrepreneurial Tech Transfer and Commercialization—to foster an entrepreneurial environment at the School and to assist GW faculty, students, and alumni with technology commercialization, start-up formation, and enterprise funding.

Mr. Tony Stanco, a corporate/securities attorney who formerly worked at the U.S. Securities and Exchange Commission, directs CET2C and has arranged several successful activities to introduce the Council to the local community.

Most recently, SEAS hosted the University Start-Ups National Showcase and Conference in late October of this year. More than 260 people from around the nation participated in this conference, which included an evening reception at the U.S. Congress and speakers from the White House Office of Science and Technology Policy, the National Governors Association, the U.S. Chamber of Commerce, NASDAQ, and a host of other organizations.

Stanco also organized and hosted the lecture series "From Lab to IPO" during the spring semester, and it garnered so much interest that CET2C is offering it again during the spring 2007 semester. As the lecture series' name implies, "From Lab to IPO" covers the practical and legal issues that entrepreneurs and would-be entrepreneurs need to know to take a great research idea from the laboratory to a successful hi-tech or biotech company.

In addition to the lecture series and an ongoing tech transfer brown bag luncheon series, SEAS hosted a CET2C kick-off event in September of this year. At the kick-off event, the School hosted a workshop on venture capital and angel investing, led by regional experts and members of CET2C, to teach alumni about the basics of angel investing and the important role that angel investors play in helping start-up companies succeed. Sixty-five participants attended the event, including venture capitalists and angel investors, entrepreneurs and heads of start-up companies, and representatives from federal laboratories and economic growth agencies.

All alumni and students are welcome to join CET2C. For more information on CET2C, please visit www.seas.gwu.edu/cet2c or contact Tony Stanco at stanco@gwu.edu.

Patents Awarded to SEAS Faculty & Their Research Colleagues

2000-2006

Professor	U.S. Patent #	Patent Name
Jason Zara	6,849,910	Systems and methods for improving the performance of sensing devices Using oscillatory devices
Sameh S. Badie	6,668,412 B1	Continuous prestressed concrete bridge deck subpanel system
R.Ryan Vallance	6,948,492	Programmable multi-dose intranasal drug delivery device
R.Ryan Vallance	6,916,115	System and device for characterizing shape memory alloy wires
R.Ryan Vallance	6,660,959	Nano-scale machining with carbon nanotubes
R.Ryan Vallance	6,736,546	Optical connector ferrule designed to minimize manufacturing imperfections and mating misalignments by incorporating exact constraint principles
R.Ryan Vallance	6,137,064	Split-via surface mount connector and related techniques
Charles A. Garriss	6,138,456	Pressure exchanging ejector and methods of use
Charles A. Garriss	6,434,943	Pressure exchanging compressor-expander and methods of use
Charles A. Garriss	6,663,991	Fuel cell pressurization system
Charles A. Garriss	Patent pending	Fuel cell pressurization system method of use
Charles A. Garriss	Patent pending	Pressure exchange ejector
Simon Berkovich and Murray Loew	6,145,071	Multi-layer multi-processor information conveyor with periodic transferring of processors' states for on-the-fly transformation of continuous information flows and operating method therefor
Shahram Sarkani	6,219,988	Wrapping system for strengthening structural columns or walls
Rhys Price Jones	7,024,022; 7,035,438; 7,035,439; 7,072,495; 7,092,551; 7,092,552; 7,095,877	System and method for measuring and quantizing document quality
Suresh Subramaniam	6,538,777 B1	Method for establishing connections by allocating links and channels
Poorvi Vora	6,748,100	Detection and deterrence of counterfeiting of documents having a characteristic color
Poorvi Vora	6,516,078	Multi-level detection and deterrence of counterfeiting of documents with reduced false detection
Poorvi Vora	6,470,299	Probabilistic privacy protection
Poorvi Vora	6,463,162	Robust watermarking for digital objects
Poorvi Vora	6,335,794	Detection and deterrence of counterfeiting of two-sided documents
John Sibert	6,184,863	Direct pointing apparatus and method

Shooting for the Stars



COVER STORY:

Anousheh Ansari: Space Explorer, Businesswoman, and Social Entrepreneur

The **IDEAS AND IDEALS** That Propel This SEAS Alumna

N-A-1-S-S, N-A-1-S-S, this is K-E-4-G-D-U, calling for scheduled contact. Over." The auditorium was silent . . . silent with anticipation . . . waiting. Can she hear us? Will we hear her? Waiting.

Again, the voice of SEAS Professor Kie-Bum Eom filled the auditorium as he called out over the ham radio microphone, "N-A-1-S-S, N-A-1-S-S, this is K-E-4-G-D-U, calling for scheduled contact. Over." Silence, and static—and then. . .

"K-E-4-G-D-U, this is November-Alpha-1-Sierra-Sierra." And there was instant relief and a rush of excitement as we made contact with SEAS alumna, Anousheh Ansari, orbiting 220 miles above the Washington, D.C. skies aboard the International Space Station.

For a brief, few minutes on September 22, 2006, SEAS students and invited students from local elementary, junior high, and high schools were able to ask questions of Ansari via amateur radio communications provided by volunteers of ARISS (the Amateur Radio on the International Space Station). Their questions were exactly what one would expect from elementary school students—"Is it hard up there without gravity?"—and college students—"What are you achieving or planning to achieve with this mission?"

And these questions only whetted our appetite to know more about Ansari and what, in fact, does inspire her, so we set out to ask our own questions in a subsequent interview—with both parties present here on Earth.

Ansari had blasted off September 18th in a Russian Soyuz spacecraft for an eight-day mission aboard the International Space Station. Accompanied by two professional astronauts, she launched from Baikanour Cosmodrome in Kazakhstan. On

that day, she became only the fourth private explorer to visit space, spending a reported \$20 million of her own money for a ticket to space. So, how did this all transpire?

Ansari grew up in Iran, watching episodes of *Star Trek* and *Lost in Space* and dreaming of her own chance to one day travel into space. At 16, and in the wake of the Iranian revolution of 1979, she was sent by her parents to live with relatives in the United States. Ansari learned English, finished high school, and later graduated from George Mason University with a degree in electronics and computer engineering. She took a job at MCI after graduation and simultaneously studied for her master's degree in electrical and computer engineering, which she earned from GW in 1992.

"Many of the people I worked with had gone to GW, and they recommended the school and said that it's really good, especially the engineering school," explained Ansari. While in school, she was looking

ahead and concentrating on getting her career off the ground. She states, "I was working full-time and going to school full-time, and because of that I didn't get to really immerse myself in the school life."

In 1993, Anousheh Ansari and her husband, Hamid, quit their jobs at MCI and launched their own company, *telecom technologies, inc. (tti)*, with her sister and brother-in-law. All four



SUITED UP: Ansari sports the space suit that she wore during her space expedition.

had studied electrical engineering with a major in telecommunications, so their new company was a natural route to take. They began as a consulting firm for telecommunications companies but after a few years of designing next-generation telecom systems, they realized that no one was building some of the technologies that the larger companies needed. They started developing software, and they struck gold when they created a softswitch that allowed voice communications over the Internet. The company grew to 250 employees and received three key U.S. patents by 2001, when the Ansaris sold the company to Sonus Networks, Inc. for approximately \$750 million.

But what of Ansari's dream of space? During the years spent building *tti*, that dream was never too far from her mind. "In my heart I always felt that I would one day be able to fly to space," she recounts. "Of course, [at times] it did seem like a distant dream, but one day I was watching CNN and they started talking about Dennis Tito. We had started our company and it was doing well. And when I saw him and the story was about how he was negotiating a deal with the Russian space program to fly to the International Space Station, I thought, 'Okay, if he is successful, he's opening a new door. The only thing I need to make sure, if everything else fails, is that the company we've built is successful enough that it will have a large return for us and I would be able to buy a ticket.' So, at that time, I knew that there is a way. And that's what happened."

After selling the company, Anousheh and her brother-in-law Amir Ansari—also a space enthusiast—became involved with the X Prize Foundation, which was then holding a competition to award \$10 million to the first non-governmental organization to launch a reusable manned spacecraft into space twice within two weeks. The Ansaris provided the title sponsorship for the prize, which aerospace designer Burt Rutan won in 2004.

Thus began a relationship with the X Prize Foundation that continues today. Ansari got involved with the Foundation in order to help promote commercial space travel, but she found kindred spirits among the organization and now is part of the X Prize Foundation's Vision Circle. "We're looking at a lot of areas like clean energy and social issues and trying to figure out how we can apply the model we had for the Ansari X Prize and the prize concept to solve some of these other pressing issues in the world," says Ansari.

This model, to which Ansari frequently refers, is the social entrepreneur model. It encourages entrepreneurs around the world to use their money to attack the root causes of various problems in their own societies. "I'm not specific on the issue itself," she says. "I'm more concerned about the approach to solving the problem, because I think the problems tie together as cause and effect for each other. If you look at solving a problem by just throwing money at it, it will dry out at one point, and somehow it brings

corruption with it. Money is necessary, but if it's not spent to correct the cause of the problem, then it's wasted."

In fact, Ansari's relationship with the X Prize Foundation makes her point. "When I started working with X Prize Foundation, for me it was not just a simple philanthropic donation. It was an investment. I think this group can really have an impact on solving a lot of world problems, and I want to be part of that," explains Ansari. "We're going to continue opening up the space frontiers but we're not going to stop there."

Ansari's philanthropic work goes beyond her efforts with the X Prize Foundation. She is also active in the ASHOKA Foundation and the PARSA Community Foundation, which promote social entrepreneurship around the world and among the global Iranian community, respectively. When asked what goals motivate her work on behalf of social entrepreneurship, Ansari replies, "My ultimate vision for the world is a world without any country borders and

INSPIRE, IMAGINE: Ansari speaks to groups of school children around the U.S. to inspire and encourage them to think imaginatively.





A PARTNERSHIP: Anousheh Ansari and her husband, Hamid, work together. Both also studied at GW.

to have citizens of the Earth instead of citizens of the United States and other countries. I know it's a big dream."

So, Ansari is a dreamer and an entrepreneur, but at heart, she seems to be an explorer: of ideas, of issues, of possibilities. According to her web site, her motivation for exploring space is her belief that doing so is critical to the health and survival of the human race. That is too big a statement to leave unexplained, and so we asked what that means; and she answered.

"Here on earth we buy insurance policies, and we back up data on our com-

puters so that we don't lose it, because we never want to be single-threaded in anything. I don't think life on Earth should be treated any differently. It's sort of ignorant of us to think that as a race we can live on Earth forever and that energy resources will last forever. There is a lot more abundant energy in space, and if we learn how to harvest and efficiently bring it back to Earth, we'll solve our environmental issues, our energy crisis. It's not going to happen overnight," she explains, "but it will happen. I feel obligated to talk about it so much. Sometimes you try to step out of it and look at the bigger picture, and that's when you try



to find a larger solution, and to me that larger solution doesn't exist on Earth. It's in space. I'm seeing that all roads lead to the same place, and that place is outer space."

EDITOR'S NOTE:

SEAS wishes to thank the volunteers of ARISS (Amateur Radio on the International Space Station), an international organization that provides amateur radio communications from the International Space Station (ISS). Because of the hard work and generous efforts of a group of nationwide volunteers, coordinated by NASA employees Mark Steiner and Frank Bauer, SEAS was able to host the September 22, 2006 "Conversation with Anousheh" while she was onboard the ISS. They generously volunteered their time, expertise, and equipment and coordinated the entire communication.



PERSPECTIVE:**Engineering Education in the U.S.**An Interview with **DR. RICHARD BUCKIUS**

This fall, Dr. Richard Buckius spoke with the editor of *Synergy* about the status of engineering education in the United States.

Buckius is the assistant director for the National Science Foundation's (NSF) Directorate for Engineering, which provides funding and support for this nation's engineering research and education enterprise. An expert in thermal sciences and professor of mechanical engineering for the University of Illinois at Urbana-Champaign since 1975, Buckius has taught at all undergraduate and graduate levels, and has repeatedly been honored at the local and national level for research and teaching excellence.

The NSF is an independent federal agency that supports fundamental research and education across all fields of science and engineering. It has a fiscal year 2007 requested budget of more than \$6 billion dollars, of which its engineering directorate's budget will be slightly over \$600 million.

SYNERGY: *Why do you believe that engineering in the United States has been so successful over the years?*

BUCKIUS: The fundamentals of the engineering profession in the United States are incredibly strong. They foster discovery and innovation in ways that simply are not possible in other nations. By that, I mean our universities and industries provide very fertile ground for interdisciplinary collaborations and transformative, frontier research. If you look at emerging areas like nanotechnology and the interface of biology and engineering, you'll see truly path-breaking fields that are just beginning to make their mark on society. You'll also notice that the world leader in these two fields is the United States.

This position of leadership did not come about by accident. Engineering research and education have been constantly evolving endeavors, always pushing beyond the frontier. You can see this even today with our nation's plans to invest in the American Competitiveness Initiative, and even in the NSF Engineering Directorate's recent reorganization. Both of these activities are efforts to stay on the leading edge of research—both in discovery and innovation—and education.

SYNERGY: *Can you give me your perspective on what's working in engineering education here in the United States?*

BUCKIUS: We're obviously producing graduates who are having a great impact, so the system works. If you look at discovery, innovation, and entrepreneurship, I think this country's been very, very successful. We're always held out as an example of those qualities, and we've always led the world in innovation. But what we see is a potentially significant change in the trends in the numbers of students that we'll produce versus the number of those coming from the global market place, and we won't be competitive on numbers anymore.

China and India, for example, have the potential to produce far more engineers than we can, but numbers do not equal innovation, and we shouldn't think of trying to out-compete on those terms. We should now be thinking, 'How can we provide a broad education for engineers so that they will have the talent and experience to lead the world in discovery and innovation?' I would argue that is where we need to focus and stay one step ahead. I don't think we've done that poorly in the past, but I also think the future will be different. It's about our nation educating the engineers with the greatest value. That is how we're going to compete in the global market. We just have to make sure that we're not lackadaisical.

SYNERGY: *So how will this impact engineering students and what does this mean for them?*

BUCKIUS: I think the answer to both will be found in interdisciplinary research and education. We need strength in our disciplines as well as in interdisciplinary activities. To succeed, our researchers are working more in teams and on problems that don't fall into one discipline. This needs to be translated to our students so that they will have the skills and understanding to excel in an integrated and interdisciplinary environment.

The foundation, of course, will still reside within the engineering disciplines. If you think about some of the research problems that our researchers are working on now, you will see a broadening of areas, so for example, you'll find bioengineers, mechanical engineers, and electrical engineers working more closely than they had before.

So, what does this mean for a student? Right now you have most of your curricular activities in disciplines, but that will need to evolve. We're not going to tear down the boundaries of every discipline, but we will need to build the bridges to create more collective interdisciplinary education in the future,

and this will have to happen right at the beginning, right at the freshman level and continue through undergraduate and graduate education.

Another issue that's gaining considerable momentum is broadening the entire scope of the engineering profession, particularly into areas that have traditionally been outside the curriculum. My personal opinion is that we'll need to see an increase in non-technical subjects—humanities, social sciences—in engineering. The curriculum content devoted to these subjects should increase, because we need a broader, more globally connected individual than we needed 20 years ago. Engineers will now have to both compete and meet demands across the globe, so students will need to be more appreciative of culture, of differences, of economics, and trends that drive the economies of other nations.

Of course, finding the time during an educational career to accomplish all these goals will create difficulties and tension for universities.

SYNERGY: *Does this mean that there's an increased likelihood that an undergraduate engineering degree will take even longer to complete?*

BUCKIUS: One of the recommendations in the *Educating the Engineer of 2020* report from the National Academy of Engineering is that the master's degree should become the recognized engineering professional degree. So there is an implication that it will take longer. However, I hope we can find a way of integrating these broader topics that is not competitively disadvantageous to the engineering students. Whether the degree takes longer to complete will depend a lot upon the preparation students have coming into universities.

SYNERGY: *Can you give me some specific ideas of changes that we*

might make in the curricula to enhance undergraduate engineering education?

BUCKIUS: One important approach is to provide broad engineering concepts from the beginning. Freshman year is notorious for attrition of engineering students. They come in; they have a perception of what engineering is going to be; and it doesn't turn out to be that. Most institutions spend a lot of time on math, physics, and chemistry in the freshman year, so students don't see a lot of engineering, and more importantly, they don't get to try their hand at design, which is the heart of engineering and what typically draws students to the field. The way to solve this is to get more comprehensive engineering courses at the freshman level, and then integrate the necessary math, physics, and chemistry courses into more comprehensive, hands-on engineering courses.

This approach has proven to be successful at a number of universities. An example is the team-taught courses by faculty from different departments across campus; yet we need a better understanding of how to transfer this approach and scale it up to be applied more broadly.

SYNERGY: *What resources do we need to make those changes?*

BUCKIUS: You're going to continue to see increased emphasis on computer-based education. The students who come into engineering now are much more oriented toward computer science and computer engineering types of activities. These will impact everything that we do as the years go on. Regardless of which disciplines students ultimately pursue, they at least have strong fundamental cyber skills. The students are prepared for this; they're waiting for it.

Another related problem in many engineering disciplines will be laboratories and facilities. Even as computer-based engineering increases and a lot of laboratories can be virtual, you'll still need

physical equipment, and that's the expensive part of engineering. That will always be the case.

SYNERGY: *What about efforts to try to retain engineering students, to reach potential engineering students in high school, and to encourage graduate study?*

BUCKIUS: Engineering needs to continue to increase the pathways into all its disciplines. We have two programs, Research Experiences for Undergraduates [REU] and Research Experiences for Teachers [RET], which have shown success. With the REU, faculty bring undergraduate students into the research environment through summer group programs or into individual research laboratories. The goal is to help the students understand what engineering research is all about. The amazing thing about this approach is that there is such a high success rate with the number of students going on to graduate school, and the REU is very successful in making this happen.

The Research Experiences for Teachers brings in community teachers for a summer program to give them materials to help them understand what engineering is and does, and then lets them go back to their K-12 classrooms and apply what they learned so students can better understand what engineering is all about. We did an external evaluation of this program, and the overwhelming consensus was that teachers found it amazingly useful.

These are very successful programs, and we have to continue investing in them. The engineering directorate receives approximately 10 percent of the NSF budget, but engineering is investing over 20 percent of the overall budget that NSF has for REU. It's even more impressive in RET, where close to 70 percent of everything that NSF invests in RET comes from engineering. So there's a real desire on the part of the engineering community to get involved

in these kinds of programs, because they have been so successful.

I also believe we need to explore ways to expand the reach of these programs. If the REU works so well at the college junior and senior levels, then we should look into expanding it to include freshman or high school students. The issue there is this: what do these students bring and how can you hook them, because they don't have all the tools or the background yet. REU can do that by giving the exciting, hands-on experience that will help carry students through their education.

SYNERGY: *What needs to be done to attract more young people in the United States to pursue engineering?*

BUCKIUS: We need to better communicate the excitement and impact of engineering. Engineering is an exciting profession, and I don't think that fact is appreciated. I think that the kinds of issues that engineers get involved in are really important to society and they're really exciting, and that's what we have to demonstrate and communicate. And maybe that's where we've been unsuccessful in the past.

We don't show the impact that engineers and the things that we do have on society. Let me give you an example. Science always asks the question "why?"; engineering asks that question, too, but it also asks "so what?". So you answer the question why but you also get to the impact. What's going to happen if

we understand this problem? How is this going to help the nation and world and improve the lives of people? When you think about the environment, energy, and healthcare, this is really an exciting time for us, and these are the kinds of issues that engineers try to address.



David Steines

A Student with **FAR-REACHING INTERESTS**

SEAS junior David Steines started his college career in GW's Elliott School of International Affairs, but transferred to SEAS after his first semester. The way Steines sees it, he simply realized that he wanted to do something "a bit more technical." He explains, "I never really lost touch with my interest in international affairs; I just made a change in what I want to do with my education."

That he has not lost touch with this interest is very apparent. Steines is leading student efforts to form a GW chapter of Engineers Without Borders, a volunteer organization that seeks to develop simple technological solutions to problems that plague the developing world and to develop socially responsible engineering students.

"I was doing some research for a class, and I ran across Engineers Without Borders, and it just seemed like a perfect fit for me, because I'm really interested in the grassroots work being done in the developing world. A lot of the major health problems in the developing world are directly related to lack of water and lack of access to sanitation, so it's a major problem that needs to be addressed. I decided to look into starting a GW chapter. It turns out that other students here were also looking into starting a chapter, but they were all seniors at the time. I met with our advisor, Catherine Woytowicz [of the Department of Chemistry], and she hooked me up with those students, who passed the work along to me."

Along with the help of SEAS students Erika Hastings, Morgan Hooker, and Rochelle Reardon—all of whom also have been active in working to form the chapter—Steines has spent a year building the organization. The process has



included initiating a formal contract between the university and the national Engineers Without Borders organization, working with the university's Student Activities Center to receive university recognition, writing up a constitution for the group, publicizing the chapter and developing a membership base, networking with other local chapters, and beginning the group's first small project.

Last year, the chapter began a local project with Washington Parks and People, a group that works to revitalize parks in Washington, D.C. Since then, the chapter has been helping rebuild an old café that is slated to become a community center in the Anacostia section of the city. Long term, the chapter has its sights set on doing international projects.

Steines explains, "Last year was primarily a networking and contact-building year. We formed a consortium with Catholic and Howard universities to pool resources, and we've held joint meetings with Catholic University.

We also met with the American Society of Civil Engineers. We hope that in conjunction with them and the local professional chapter [of Engineers Without Borders] and the students from Catholic University that we can actually engage in our first international project this year."

Having started his college career outside the engineering school, Steines is eager to bring non-engineers into the chapter's first international project, and he recognizes the role that they can play. He was thrilled that many students from GW's Elliott School of International Affairs and Columbian College of Arts and Sciences have participated in the early stages of GW's chapter. "We're trying to figure out how to integrate non-engineers into the program more and more," says Steines "because there is more than the engineering aspect to what we're doing. When you put a new technology into a developing community, there's an important social aspect to it, and there's a lot of expertise that non-engineers can contribute to these projects."

Dr. Azer Kehnemui

An Alumnus with **MANY TIES TO GW**



Azer Kehnemui needs no introduction to most structural engineers in the Washington, D.C. area.

Some are familiar with his name and the well-respected company he has built; others have worked with him on projects; and even more have studied under him.

Kehnemui is the president of SK&A Structural Engineers, a firm that provides structural consulting engineer services for clients in the D.C. area, along the East Coast of the U.S., and nationally and internationally. The client list on the SK&A website is long and impressive and includes a range of government agencies and private companies such as the World Bank, the U.S. Department of Agriculture, Trammel Crow, General Electric Company, United Postal Service, and a host of other well-

known enterprises. Most recently, SK&A was awarded contracts for upcoming construction around the new Nationals baseball stadium, at the Old Conventon Center site, for projects adjacent to the future Tyson's Corner Metro station, and for retro-fitting work to make Constitution Center a secure building.

Kehnemui joined the company in 1963, but after several years he started feeling that he was falling a bit behind in his technical knowledge. He decided to pursue a doctoral degree in structural engineering and selected GW for his studies. He received his D.Sc. in 1975 and was promptly asked by the civil engineering department to teach here on a part-time basis. Kehnemui obliged, and for 25 years he taught courses on reinforced concrete, high-rise building construction, and other structural engineering topics. In fact, Kehnemui says,

"Many, many of the structural engineers in the D.C. area have at one time or another taken courses from me."

One wonders how Azer Kehnemui found time to teach all those years. He replies simply, "I absolutely enjoyed teaching. It gave me a great deal of pleasure to teach students the practical side of things, how you really design something, as opposed to what the book says." Even with his teaching responsibilities, Kehnemui has managed over the years to become involved in other university and civic groups, as well. He is a member of the GW Department of Civil and Environmental Engineering (CEE) advisory board, the Rotary Club of Washington, D.C., the Coalition of American Structural Engineers, the American Consulting Engineers Council, and the American Society of Civil Engineers.

Azer Kehnemui has been a good friend to GW and is motivated by the concept of giving back. Beyond teaching, beyond his service on the CEE advisory board, he has helped in another fundamental way: his firm has hired a number of GW graduates and given them their first jobs out of school. Says Kehnemui, "We used to look for experienced engineers, but we learned to balance experience with up-to-date knowledge, and we began shifting focus to new graduates, preferably with advanced degrees. The important thing is that they have a good education." He adds, "If we have an applicant from GW, we always take that very seriously and we look at the applicant very carefully."

Events

Astronaut Charlie Camarda Receives GW President's Medal

Astronaut and SEAS alumnus Charlie Camarda (MS '80) visited GW and SEAS in October 2005 to present to GW President Stephen Joel Trachtenberg the GW banner that he flew into space aboard the "Return to Flight" shuttle mission that summer. Camarda also received the GW President's Medal—the highest honor bestowed by GW—at a university ceremony that evening. Camarda, who has logged more than 333 hours in space, served as a mission specialist aboard the shuttle mission.

Camarda began his visit by meeting with SEAS faculty and SEAS students in two separate, informal sessions. He met first with SEAS faculty to discuss ways that American universities can inspire young people to go into engineering disciplines, and to mentor them so that they have the skills eventually to become top-notch senior engineers. He was consistent in delivering the message that engineers were the "real heroes" behind the recent shuttle mission. "Engineers are the reason that we are back up flying," said Camarda. "I want people to understand how much talent it took from these men and women to get the program back up."

During his session with SEAS students, Camarda gave a presentation that focused on the engineering discoveries and feats behind the shuttle flight. His presentation included slides and time-lapsed video sequences of key events and the behavior of various materials that were tested in preparation for the launch. He stressed to the students the importance of interdisciplinary work in engineering, saying, "My advice is to learn to listen to people from other disciplines and learn to understand where they're coming from, technically."

At the medal ceremony in the evening, Camarda shared his experiences aboard the Space Shuttle Discovery with a



Charlie Camarda (left) presents to President Trachtenberg the GW banner that he flew into space.

broader audience, using video footage of the mission on large overhead screens. After his presentation, Camarda met with students and other guests in the lobby outside the auditorium, taking questions and offering advice to students.

Harrauld Testifies on Capital Hill

Professor John Harrauld of the Department of Engineering Management and Systems Engineering was called to Capitol Hill twice during the 2005-06 academic year to testify on emergency management matters.

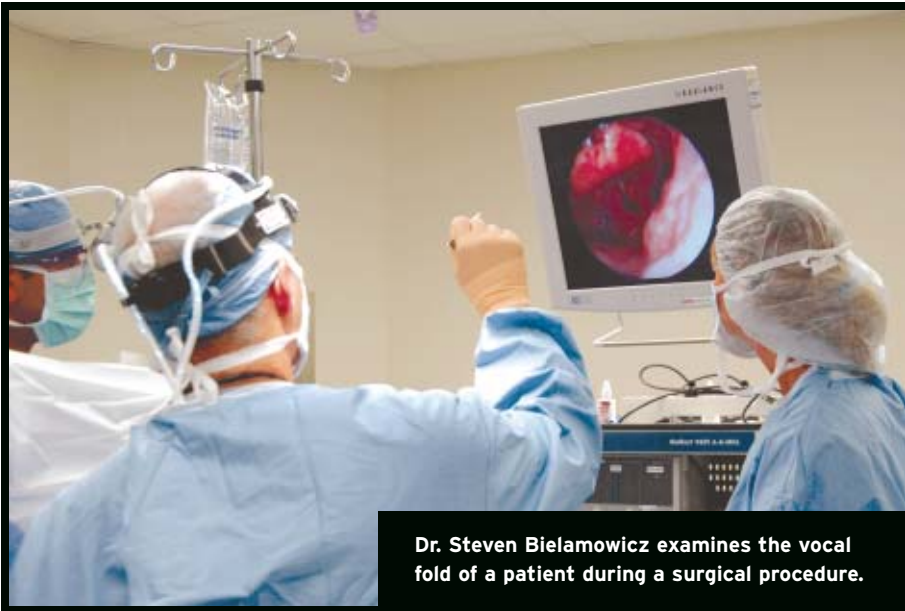
On June 8, 2006, Professor Harrauld testified before the Senate Committee on Homeland Security and Governmental Affairs during its "National Emergency Management: Where Does FEMA belong?" hearing.

He had been working with the committee staff since Hurricane Katrina to help them understand some of the organizational problems and issues created by the way FEMA was incorporated into the Department of Homeland Security (DHS). His testimony, available on the SEAS website, recommended leaving the responsibility for emergency management within the DHS. Professor Harrauld testified that Congress should not trans-

fer emergency management responsibilities to the Department of Defense or create another two-year disruption by attempting to re-create an independent FEMA.

"The testimony for the Senate committee was part of a continuing dialogue with the committee staff that contributed to the bill S. 3721, Amendment to the Homeland Security Act of 2002, to establish the U.S. Emergency Management Agency and other purposes," said Harrauld. "The main points of this bill—the strengthening and full funding of FEMA, and the recombination of preparedness, response, and recovery authority and functions under FEMA—were incorporated into the DHS 2007 appropriations bill. I think the committee made very necessary changes, and hope that my input helped."

Professor Harrauld also testified on Capitol Hill in September 2005. He spoke before the House Committee on Government Reform on lessons learned from the response to Hurricane Katrina.



Dr. Steven Bielamowicz examines the vocal fold of a patient during a surgical procedure.

SEAS Receives \$2.8 Million NIH Grant

An interdisciplinary partnership between SEAS and GW's School of Medicine and Health Science is bringing together researchers from both schools in response to a unique grant opportunity. The proposal, funded by the National Institutes of Health (NIH), calls for researchers to utilize computer-based tools to improve a surgical procedure that helps patients with a voice disorder caused by vocal cord weakness.

Vocal fold problems can cause a person to have difficulty with voice production, and the surgical procedure used to correct this problem and restore a patient's voice—called medialization laryngoplasty—is currently dependent on the surgeon's skills and intuition. Even for the most experienced surgeons, the procedure fails in about 24 percent of the cases, which requires an additional surgery.

An image-guided procedure will be developed to help the surgeon during the surgery. "By superimposing the CT data from the patient with the actual larynx of the patient during surgery, we are in essence giving the surgeon X-ray vision," said James Hahn, chair of the Department of Computer Science and director of the Institute for Biomedical Engineering.

"This will allow the surgeon to place the implant much more accurately than is currently possible."

The image-guided system will be tested on cadavers by Raymond Walsh, professor and chair of GW's Department of Anatomy and Cell Biology, and his team. "We propose to use computer simulation of the air flow in the larynx to predict the interaction of air with vocal folds that are responsible for voice production," said Professor Rajat Mittal of the Department of Mechanical and Aerospace Engineering. "This will produce a computer-based surgical planning tool that will reduce the dependence on a trial-and-error process."

In the short-term the team hopes to improve the success rate of this surgery, reducing the need for additional surgeries and the associated health care costs. Their longer-range goals are to answer important questions related to biomechanical modeling and the simulation of voice production and to improve image-guided surgical procedures.

This four-year, \$2.8 million NIH grant is the first of its kind for SEAS. "The NIH's main vehicle for funding research is the R-01 grant," said Dean Timothy Tong, "and this is the first time that SEAS has been awarded a grant of this type. We're

very proud of the grant and of the work that the Institute for Biomedical Engineering has done to prove itself worthy of such an award."

Zara Receives Biomedical Engineering Research Grant

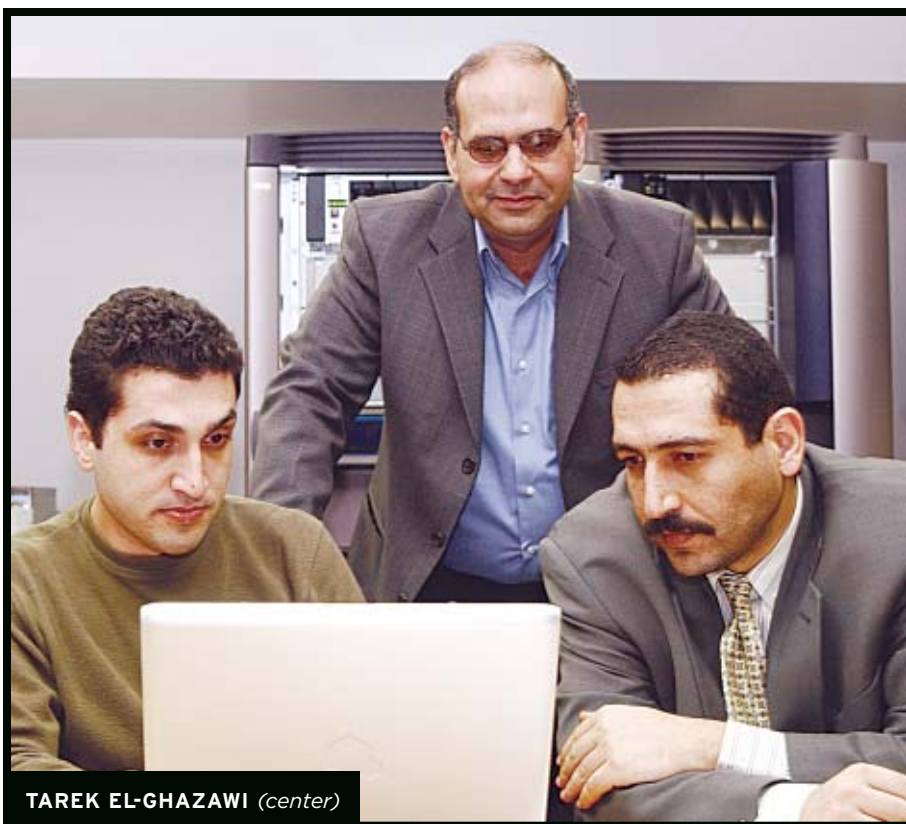
Jason Zara, assistant professor in the Department of Electrical and Computer Engineering, has been selected to receive the Wallace H. Coulter Foundation Early Career Translational Research Award in Biomedical Engineering. He is one of this year's 23 researchers selected from a nationwide pool of applicants.

"I am pleased to be a recipient of this prestigious award," said Zara. "Receiving this important funding will assist my efforts to develop new technologies for optical imaging that can be used in the clinic to improve the diagnosis of life-threatening diseases and ensure timely treatment."

Zara will conduct the funded research at GW on microfabricated optical coherence tomography (OCT) imaging probes. OCT is an optical imaging technique similar to an ultrasound. Zara is working to further develop an "optical biopsy" using OCT to detect precancerous and cancerous conditions in vivo without surgery. Zara's primary areas of research focus on the applications of micro-electrical-mechanical systems (MEMS) actuators in medicine and high-resolution medical imaging, and his current work includes the development of new instrumentation for high frequency ultrasound and infrared optical coherence tomography. He is also exploring all areas of medical imaging, primarily focusing on the development of new imaging instrumentation.



JASON ZARA



TAREK EL-GHAZAWI (center)

SEAS Takes Major Steps in High-Performance Computing

SEAS recently organized the first GW Symposium on High-Performance Computing and Applications, which was held at the Marvin Center in October 2006. The symposium was conceived to provide a forum to showcase advanced computing work at GW and to learn about the direction and key programs of the federal government in high performance computing. It was co-chaired by SEAS Professors Tarek El-Ghazawi, Steve Kan, and Rajat Mittal, and approximately 60 people from government, SEAS, and GW's Columbian College of Arts and Sciences attended. The opening remarks were given by the University's Executive Vice President Donald R. Lehman.

Among the topics covered at the symposium were computational fluid dynamics, crash analysis simulations, advanced computer systems and programming models, computational high-energy physics, and computational chemistry. In addition to the presentations given by

SEAS and other GW faculty, leaders from various federal agencies and government laboratories also addressed the symposium. Among them were the Defense Advanced Research Projects Agency (DARPA), National Science Foundation, Naval Research Laboratory, and the U.S. Department of Transportation.

Earlier that month, GW and the Army High-Performance Computing Research Center sponsored the second Partitioned Global Address Space (PGAS) Conference. The conference brought together high-performance computing programmers and language designers to continue to share their ideas and experiences and to discuss challenges and solutions to programming complex supercomputers of today and the future. PGAS programming models simplify programming and enhance performance of high-performance computing systems. The conference drew nearly 100 attendees from academia, government, and industry, including the U.S. Department of Defense, IBM, Cray, and Hewlett-Packard.

On a third front, The National Science Foundation (NSF) has awarded GW a preparation grant to create a new, national NSF industry/university research center at GW and the University of Florida. The center, which is now in the preparation stages, will offer its members and researchers one of the most advanced and powerful research test beds in the world for high-performance reconfigurable computing. Known as CHREC (pronounced "shreck"), the Center for High-Performance Reconfigurable Computing will be the nation's first multidisciplinary research center in this field established as a basis for long-term partnership and collaboration among industry, the academic community, and government.

GW has already received tremendous support for the center from industry. Its current membership portfolio includes all the major players in high-tech: Intel, Hewlett-Packard, SGI, the National Security Agency, Oak Ridge National Laboratory, National Cancer Institute, Linux Networks, and the Arctic Region Supercomputing Center. Each of these members will make significant financial contributions to the Center.

The center creation process is a three-step process. The NSF has already approved two of the steps, which resulted in the current preparation grant. If the final awarding is made, the center will be operational by the beginning of 2007.

El-Ghazawi is co-director of the Center, along with Professor Alan George of the University of Florida.

Florea Selected for Sloan Fellowship

Professor Liliana Florea of the Department of Computer Science has received a 2006 Sloan Research Fellowship. This is a prestigious competition among the very best young faculty members in seven fields: chemistry, computational and evolutionary molecular biology, computer science, economics, mathematics, neuroscience, and physics. She is one of this year's 12 researchers who were selected from a nationwide pool of applicants to receive Sloan Research Fellowships in computational and evolutionary molecular biology.

Florea's research applies computational techniques to solve problems related to biology and medicine. Her Sloan Fellowship supports several activities related to this research, including: the development of tools and methods to analyze the human hepatitis C virus and bacterial genomes such as *E. coli*; efforts to design new, large-scale computational tools to compare genomes and genes across different species; and studies of gene variations in different tissues or at different stages of development or disease.

"It is a great honor to be selected for the Sloan fellowship," said Florea. "This grant will help me greatly in putting some key pieces into place in my computational biology research efforts."

LILIANA FLOREA

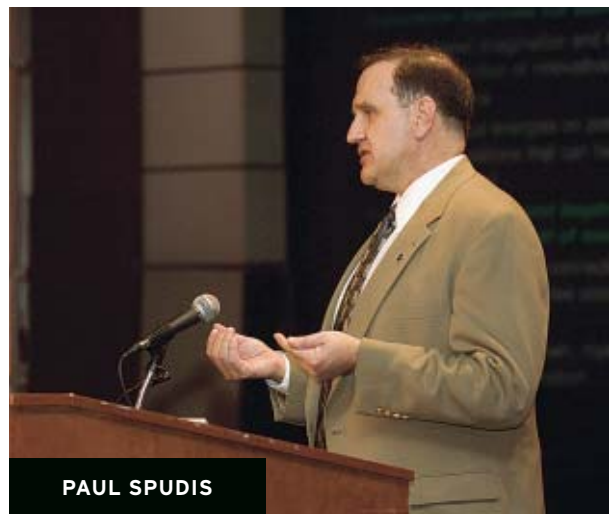
Paul Spudis Delivers Frank Howard Lecture

More than 100 SEAS alumni and friends gathered at the Media and Public Affairs Building in October of this year to hear the Frank Howard Lecture, delivered by Dr. Paul Spudis, a geologist at the Johns Hopkins University Applied Physics Laboratory. In a presentation entitled "Robotic Exploration of the Moon: Preparing the Way for Human Return," Spudis covered several themes related to space exploration.

Starting at the foundation of all space exploration, Spudis briefly commented on the "very human impulse to explore," stating, "Exploration excites creative energy within human societies, and creativity is what we use to solve problems that we otherwise would not be able to solve." He continued, saying, "The history of life on earth is species extinction . . . and the fundamental impetus that sends us into space to explore is to preserve the human species."

Spudis told the audience that the new vision for space exploration calls for humans to return to the Moon sometime in the next decade, and he offered several reasons why the Moon is next. In addition to being a good training lab, the Moon is also a good platform for doing sensitive, precision experiments. In addition, it is resource-rich in space terms; and the drama of seeing other human beings on the Moon can help encourage the next generation of engineers to take up space exploration.

Visiting the Moon extends human reach beyond low Earth orbit and offers new material and energy resources for creating new space faring capabilities. In several future missions, robots will collect knowledge and create infrastructure on and around the Moon, and according to Spudis, these robotic missions to the Moon will be crucial to gathering information about how people and



PAUL SPUDIS

machines can be utilized to explore and utilize planetary surfaces.

Dr. Spudis was deputy leader of the Science Team for the Department of Defense Clementine mission to the Moon in 1994 and is the principal investigator of an imaging radar experiment on the Indian Chandrayaan-1 mission, to be launched to the Moon in 2007. He also served as a member of the President's Commission on the Implementation of U.S. Space Exploration Policy, and received the NASA Distinguished Public Service Medal for his work on that body.

The Frank Howard Distinguished Lecture Series is sponsored by SEAS, the GW Engineer Alumni Association and the GW Alumni Association. It is an endowed lecture fund established in 1945 by a gift from its namesake to bring outstanding leaders of science and industry to GW to discuss timely topics in engineering and allied subjects.

New Faculty



Dr. Frank Fiedrich

Frank Fiedrich is an assistant professor in the Department of Engineering Management and Systems Engineering. Among his many research interests are the use of IT for disaster management and response; group decision making and inter-organizational response in complex

emergencies; and early warning systems for natural disasters. Before joining SEAS, Fiedrich worked as a consultant in applied research in Switzerland and as a research associate for the Institute for Technology and Management in Construction at Karlsruhe University in Germany. Fiedrich earned his Ph.D. in civil engineering from Karlsruhe University in 2004.



Dr. Matthew Kay

Matthew Kay is an assistant professor in the Department of Electrical and Computer Engineering. His research interest is to understand the spatiotemporal dynamics of cardiac electrical activity during normal and disease conditions. His expertise includes fluorescence and electrical

imaging of cardiac electrophysiology (ex-vivo and in-vitro), custom image and signal processing, and computational models of cardiac tissue. Prior to joining SEAS, Kay was a research assistant professor at both the University of Alabama in Birmingham and in GW's Department of Pharmacology and Physiology. Kay received a D.Sc. degree in biomedical engineering from Washington University in St. Louis in 2000.



Dr. Rhys Price Jones

Rhys Price Jones joined the Department of Computer Science after teaching at Indiana University-Purdue University at Fort Wayne, Oberlin College, and Rochester Institute of Technology. His research interests include bioinformatics, programming languages, games, artificial

intelligence, and graph theory. He is named on seven patents related to a system and method for measuring and quantizing document quality. He has developed software to prepare molds

for non-circular gears, analyzed Connect-4 type games, and implemented generalized coloring algorithms for hypergraphs and genetic programs for gene prediction. Price Jones received his Ph.D. in 1976 from Royal Holloway College, University of London.



Dr. Pedro Silva

Pedro Silva comes to GW from the faculty of the University of Missouri, Rolla. He is an associate professor in the Department of Civil and Environmental Engineering, and his research interests include the development of performance-based procedures for the seismic design

and retrofit of civil structures; blast resistance of structures; and the use of fiber-reinforced polymers for the structural rehabilitation of civil structures. Silva received a Ph.D. in structural engineering from the University of California, San Diego in 1998.



Dr. Vesna Zderic

Vesna Zderic is an assistant professor in the Department of Electrical and Computer Engineering. After receiving her Ph.D. in bio-engineering from the University of Washington in 2004, Zderic completed a postdoctoral fellowship with the National Space Biomedical Research

Institute. Zderic's research interests include ultrasound-enhanced drug delivery; therapeutic ultrasound wound healing; ultrasound therapy for hemorrhage control and tumor treatment; and the design, manufacture, and characterization of therapeutic ultrasound transducers.



MARTHA PARDAVI-HORVATH

Dean Tong Names New Associate Dean

Professor Martha Pardavi-Horvath joined the SEAS administration at the start of the 2006-07 academic year, serving as the associate dean for academic affairs.

Pardavi-Horvath is a professor of engineering and applied science in the Department of Electrical and Computer Engineering (ECE) and has been a member of the SEAS faculty since 1989. During her tenure at ECE, Pardavi-Horvath has been active in a number of committees, including both undergraduate and graduate curriculum committees, the ECE graduate admissions committee, and for many years as the SEAS representative on GW's Honors Program committee. Before coming to GW, Pardavi-Horvath was the head of a research lab at the Central Research Institute for Physics in Budapest, Hungary, and she completed her post-doctoral work at Ohio State University.

Pardavi-Horvath's responsibilities as the associate dean for academic affairs include curriculum issues; accreditation; and program development within SEAS, with other GW schools, and with

other engineering schools. When asked how she is adjusting to her new position, Pardavi-Horvath said, "When I was in the ECE department, I used to send people to this office any time they had a problem related to academic affairs. Now I'm on the receiving end, but I'm learning a lot!"

Although she is new to the position, Pardavi-Horvath recognizes its importance and is happy to be in the role she is in. "Several of our programs will undergo serious academic evaluations this year, so this is a critical time," she says. "This position provides a service to the school in many ways, and dealing with people is what I really enjoy, so I'm happy to be here."

Faculty Honors

Professor Edward Della Torre of the Department of Electrical and Computer Engineering has been elected to the Board of Directors of the IEEE (Institute of Electrical and Electronics Engineers). His term as director is effective for calendar years 2007-08, and he will serve as one of the Board's eight technical activities directors.

Managing Complex Systems – Thinking Outside the Box, the most recent book written by **Professor Howard Eisner** of the Department of Engineering Management and Systems Engineering, was published by John Wiley in September 2005.

The IEEE Computer Society publications board approved **Professor Tarek El-Ghazawi's** nomination as an associate editor of the *Transactions on Computers*. The appointment is for two years.

Professor Charles Garriss received the 2006 Thomas A. Edison Patent Award "for the invention of a pressure exchanging ejector that pioneers a novel energy transfer process with the potential to save energy and reduce the environmental impact of a wide range of energy-intensive technologies." The Thomas A. Edison Patent Award was established in 1997, and is bestowed in recognition of a patented device or process that has the potential to significantly enhance some aspect of mechanical engineering.

Professor C. Diane Martin, the former chair of the Department of Computer Science, has taken a leave of absence to serve as dean of the College of Information Systems at UAE University for Emirati Women.

Professor Rajat Mittal received the 2006 ASME Fluids Engineering Division, Moody Award for a paper he co-authored entitled "Vortex Dynamics and Mechanisms for Viscous Losses in the Tip-Clearance Flow - FEDSM2005-77175." Professor Mittal co-authored the paper with Professors Moin, Wang, and You, all of Stanford University.



Dean Tong (left) with Raymond Pickholtz (center) and Douglas Jones (right)

Jones and Pickholtz Give to GW in Many Ways

EDITOR'S NOTE: By *George!*, the official GW newspaper, published a version of the article below on GW faculty who give back to the University. SEAS emeritus faculty members—Douglas Jones and Raymond Pickholtz—were highlighted in this article, written by Raina Lenney of GW's Advancement Division.

Douglas Jones, professor emeritus of engineering, received three degrees from GW—a bachelor's in mechanical engineering in 1963, a master's degree in 1965, and a doctorate of science in 1970. As a teaching assistant and faculty member, Jones taught at GW for 47 years, retiring in 2004. His colleague, Raymond Pickholtz, professor emeritus of engineering, taught electrical engineering and computer science at GW for over 30 years and retired in 2004. Aside from engineering, what do these two men have in common? A lot, it turns out.

For starters, both are extremely dedicated to students, a quality that often extends far beyond the boundaries of the classroom. Pickholtz recalls housing graduate students in his own home, when necessary, and has kept up with all of his doctoral students, even post-retirement. Jones also recalls subsidizing some of his students' expenses occasionally, and took pleasure in watching them advance

through their courses of study. "I continue to follow the progress of my doctoral students," he says. "I enjoyed mentoring students the most."

Jones and Pickholtz have something else in common—in addition to teaching, both have demonstrated their commitment to SEAS through the establishment of generous endowments. In 2002, Jones established the Douglas L. Jones Graduate Fellowship in Mechanical Engineering, an annual scholarship for a deserving student. Jones views the benefits of the fellowship as two-fold: assist a student who might otherwise not be able to attend GW, and attract the best students possible to the School, thereby raising the School's profile nationally. The fellowship was awarded for the first time this past fall.

Last year, Pickholtz committed a sizeable gift to establish the Raymond L. Pickholtz Graduate Scholarship, which supports a student in communications engineering. His gift was matched by Timothy Tong, dean of the school, and enhanced by numerous contributions from faculty, former students, and former colleagues in honor of Pickholtz's retirement. Pickholtz hopes the scholarship will make a small dent in graduate students' costs. "Graduate students have the ability to live on the margin," he says, "and a little bit of money makes a big difference."

Pickholtz and Jones have demonstrated their commitment to students through mentoring, teaching, and the creation of endowed scholarships, and they hope to encourage others to do so. Jones made an additional gift to his endowment this year and is interested in finding ways to attract other donors. Pickholtz would also like to continue the growth of his endowed fund. Why have these professors chosen to give back to GW? "GW has treated me well," says Jones, "and this is a way of giving back to the University."

SEAS lists information on all endowed funds supporting engineering at GW on our website. If you would like to learn more or if you would like to make a gift to an endowed fund, please visit www.seas.gwu.edu/endowment.

Lang Named to Crane Professorship

Professor Roger Lang of the Department of Electrical and Computer Engineering has been appointed the L. Stanley Crane Professor of Engineering at SEAS.

Lang's research concentrates on microwave propagation and scattering. During the 1980s, he developed a physics-based modeling method for understanding propagation and scattering in vegetation, and the IEEE subsequently cited this work in electing him a Fellow of the IEEE. Since then he has worked closely with NASA to develop algorithms for estimating soil moisture under vegetation and forest biomass. The long-term goal of this research is improved weather prediction and an understanding of global warming.

Professor Lang is presently chair of the U.S. National Committee URSI Commission F on Wave Propagation and Remote Sensing, and he sits on the editorial board of *Waves in Random and Complex Media*.

The L. Stanley Crane Professorship was established by the Consolidated Rail Corporation (Conrail) in 1988, at the time of Mr. Crane's retirement from the company, in recognition and appreciation of his service to the industry. Conrail established the professorship at GW to advance engineering education and research and to perpetuate their benefits to business and society. L. Stanley Crane, who earned his bachelor's degree in engineering at GW and devoted his professional life to the railroad industry, was the chief executive credited with turning around Conrail, a major U.S. corporation, in the 1980s.

ROGER LANG



Retiring SEAS Faculty

SEAS salutes three retiring and recently retired faculty members.

MICHAEL FELDMAN, PROFESSOR OF ENGINEERING AND APPLIED SCIENCE

Professor Feldman has been a member of the GW faculty since 1975 and will retire from the University and Department of Computer Science at the end of this academic year.

At GW, Feldman is well-known for his six undergraduate textbooks, his teaching of the foundation courses in computer science, and his advising and mentoring of undergraduates. The students have chosen him as computer science professor of the year four times, and in 2003 he received the university-wide Oscar and Shoshana Trachtenberg Prize for Teaching. He has also supervised a number of doctoral students, primarily in computer science education research. He and his students have developed a number of software packages for teaching computer science undergraduates; these freely-distributed products have been quite popular and are used in hundreds of colleges.

Professor Feldman has been active in national computer science accreditation. He has coordinated several of the University's computer science accreditation visits and has often acted as an evaluator and independent assessor of computer science programs elsewhere.

CHARLES GILMORE, PROFESSOR OF ENGINEERING AND APPLIED SCIENCE

Professor Gilmore was a member of the GW faculty from 1971 to 2006 and a professor of engineering and applied science in the Department of Mechanical and Aerospace Engineering.

Gilmore developed the graduate program in materials science at SEAS, and in 1990, he co-founded the GW Institute for Materials Science with Professor David

Ramaker of the Department of Chemistry. He co-directed the Institute with Ramaker from its inception through 2006, providing a forum to promote research in materials science and developing numerous experimental facilities for conducting related research at GW. Throughout his career, Gilmore published more than 50 refereed papers in subject areas that include molecular dynamics, simulation of thin film growth, growth of thin films, laser direct writing of electrical components, and phase transformations and mechanical properties of titanium alloys.

Gilmore also served in several leadership positions. From 1991-92, he served as the acting dean of SEAS; from 1994-97, he was the School's associate dean for research; and from 1981-85, he was the chairman of the then-named Department of Civil, Mechanical, and Environmental Engineering.

JOHN WHITESIDES, PROFESSOR OF ENGINEERING AND APPLIED SCIENCE

Professor Whitesides was a member of the GW faculty from 1968 to 2006. He joined GW's Department of Mechanical and Aerospace Engineering to develop relations between the University and NASA Langley Research Center, leading to the creation of the Joint Institute for Advancement of Flight Sciences (JIAFS).

As the management official of JIAFS, Whitesides was responsible for its day-to-day operation and for proposing, planning, and implementing the Institute's programs. During his tenure, Whitesides initiated innovative joint research and educational programs in acoustics, aeronautics, environmental modeling, materials science, astronautics, and aircraft systems and design. The programs were supported by more than \$40 million in grants and cooperative agreements. In recognition of the contribution that JIAFS has made to the Langley professional education pro-

gram, NASA presented Whitesides with its highest civilian award, the Distinguished Public Service Medal.

Whitesides conducted basic research in stability of differential equations, computational fluid dynamics, and graduate engineering education, and his research led to more than 30 publications.



Charles Gilmore (left) and Michael Feldman (right) share a laugh. John Whitesides was not present.

Achievement



NATHAN GREEN

SEAS Students Named Goldwater and Fulbright Scholars

SEAS is pleased to announce that Izaak Beekman and Nathan Green received the Goldwater and Fulbright Scholarships, respectively, at the end of the last academic year. Both are very prestigious awards.

The Goldwater Scholarship was established by the Barry M. Goldwater Foundation to provide the U.S. with a continuing source of highly qualified scientists, mathematicians, and engineers. The Fulbright Program is the U.S. government's flagship program in international educational exchange.

The Goldwater Scholarship is based on academic achievement, recommendation letters, and the nominee's research proposal. Beekman, a senior studying mechanical engineering with an aerospace option, chose to submit a proposal that looks into the viability of using dragonfly-like wings on micro-aerial vehicles. "I'm studying the aerodynamic properties of one cross-section of a certain dragonfly wing," he explains. His proposal is a corollary to the research he had arranged to do as part of another fellowship that he holds, the Gamow Fellowship.

As for his plans after undergraduate study, Beekman says, "I would like to go to graduate school and pursue a master's, if not a Ph.D., in a field related to fluid mechanics. I have a number of interests within fluid mechanics: biological flows, propulsion—you name it. That'll be a tough decision when I get there."

For his part, Nathan Green has already narrowed his field of study. Green, who finished his master's degree in computer science at the end of last year, has begun his Fulbright Scholarship studying applications of narrative computer coding at the University of Iceland.

Nathan is developing a system that takes computer code and generates descriptive narrative paragraphs to give programmers an additional way to view the logic of their software and algorithms. Nathan will translate the paragraphs into Icelandic to study the differences in the paragraphs' logic between English and Icelandic, and to test how long it takes students to find logic errors in an algorithm by reading the corresponding narrative. Nathan chose to study in Iceland, in part, because its ancient language has had little or no influence from English, and he wants to see how his narrative can be interpreted differently in a language that hasn't been influenced by English logic constructs.



IZAAK BEEKMAN

Not Your Average Model Plane

It is true that Kemp Kernstine, a SEAS senior, has been building a model airplane out of balsa wood, but this is no toy project. Kernstine is leading a project of which many aspiring engineers can only dream: he is overseeing an integral part of a research project funded by the U.S. Air Force.

Under the supervision of Professor David Chichka of the Department of Mechanical and Aerospace Engineering, Kernstine and the other student members of the Coordinated Vehicle Systems Group (CVSG) have been laboring to build, test, and fly an unmanned aerial vehicle that will serve as a test bed for advanced autonomous control algorithms.

The project is primarily funded under a three-year grant from the Air Force's Office of Scientific Research. It supports both a research component in cooperative and coordinated control theory and it creates a testing facility so that undergraduates can learn about building, testing, and flying planes.

"The idea," Kernstine explains, "is to build unmanned, autonomous vehicles that cooperate by following each other based on vision, and can work together without having to tell each other over radio what they are doing. Some advantages of this technology would be improved fuel efficiency or stealth missions that don't need to rely on beacon signals." In the near term, however, the project aim is to build planes that can follow others by keeping them in the field of view of a camera mounted on the following vehicle.

The project was started by Professor Chichka and SEAS undergraduate Adam Nadel in 2004, but after Nadel graduated in 2005, Kernstine took over leadership of the project and responsibility for building the plane. Kernstine built the prototype out of balsa wood and completed it last semester with the help of SEAS student Cory Walker. It is more than six feet long, weighs 50 pounds fully laden, has a 14-foot wingspan, and is capable of reaching

speeds of 50 miles per hour. During the summer, he completed a ground test of the plane and put the electronics components in it.

Earlier this semester, Kernstine, SEAS graduate student Pat Mills, and Professor Chichka took the plane to a local radio-control flight field for more ground testing, and Ed Leibolt of the DC Radio Control Club volunteered his time to help with the test and make recommendations for modifications to the plane. During the test, the plane unexpectedly took flight, and sustained some damage on landing, but this did not seem to cause a great deal of concern. "Setbacks in testing are not unexpected," says Professor Chichka. "They give you an opportunity to make the plane better as you rebuild it. In fact, Kemp will incorporate some of the advice that Ed Leibolt, a more experienced builder and operator, gave him during the ground test."

When asked what he has learned from this project, Kernstine replies, "There's no way to put it. I had no idea how a plane worked. I can now fully describe a plane: how to calculate lift and drag, how to build a plane, how to fly a plane."

Tigli Receives Amsterdam Teaching Award

In April 2005, computer engineering doctoral candidate Onur Tigli received the University's Phillip Amsterdam Graduate Teaching Assistant Award. Named after university trustee Phillip Amsterdam, the award is given each year to three teaching assistants who have most contributed to the educational success of their students by generating enthusiasm and innovation in the learning process.

Tigli began teaching in 2001 and quickly discovered that he is quite good at it. "One of my mentors in undergrad was a TA [teaching assistant] I had. He was very knowledgeable in every discipline of electrical and computer engineering, and he was the image I had of what I wanted to be for others," says Tigli. "When they gave me my first teaching assignment, I immediately began to create some other material to stimulate the interest of the students. The only thing on my mind was to try to be a role model for my students as my mentor was for us."

Not satisfied with the standing curriculum for one of the labs he taught, Tigli added an industry-standard, hardware description language that had not been taught before in the course. Says Tigli,



"It's usually taught at the graduate level, but I wanted to integrate it into this undergraduate course, so students were exposed to this language for the very first time. Students later went to interviews and got job offers based on knowing that language. The feedback I'm getting from them is that people are amazed that they are learning this at the undergraduate level."

When asked what he enjoys about teaching, Tigli replies, "The most joyful thing about teaching is trying to transfer this knowledge that you think you actually have to others who are open to take it."

As for his future plans, Tigli explains, "I always thought that after my degree I would go for industrial work. I never thought about academia, but I have enjoyed teaching so much that now I'm considering academia as an option."

Tigli's doctoral research area is MEMS (micro-electrical-mechanical systems) and the design and implementation of surface acoustic wave based-bio-sensors using MEMS.

Kemp Kernstine (right) prepares the airplane for its ground test.



Honor Roll of SEAS Donors

MESSAGE FROM THE DEAN

I am very grateful for the commitment and philanthropic support of the SEAS community. Gifts made by our alumni, corporate sponsors and other friends have a substantial impact on our ability to achieve greatness. This support has enabled SEAS to continually enhance an exceptional educational and research environment at The George Washington University. I would like to extend my deep gratitude to each of the donors listed below. Your gift to SEAS is what propels us forward, fulfills dreams, and impels us to lofty deeds. Thank you for your generosity.

Sincerely,



Timothy W. Tong
Dean

1821 Benefactors

This society is the University's highest level of donor recognition. Established in 2004 and named for the year The George Washington University was founded, 1821 Benefactors honors individuals, corporations and foundations that have made the most significant gifts to GW. Lifetime membership is granted to those who have made outright gifts of cash, securities, or marketable property, including irrevocable planned gifts, totaling \$1 million or more.

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Established in 2006, the Tempietto Circle of the Heritage Society, named for the tempietto ("little temple") that stands as a campus landmark in Kogan Plaza, recognizes those individuals who have made a documented planned gift of \$500,000 or more to the University through a life income arrangement, a bequest intention, a life insurance policy in which the University is owner and beneficiary, or another planned giving provision.

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The School of Engineering and Applied Science is happy to acknowledge and thank each benefactor who made a gift to the school between July 1, 2005 and June 30, 2006. These benefactors include alumni, businesses, foundations, and friends (non-graduates), faculty, staff and individuals who have remembered SEAS in their wills. Their gifts total more than \$3.6 million and include payments on previous pledges, gifts in kind (equipment), outright gifts of cash and estate gifts.

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Key

Deceased = ■

Five-year consistent donor = *

Faculty/Staff = +

News



2006 HALL OF FAME INDUCTEES

Engineering Hall of Fame

SEAS has a long and proud history of accomplished alumni, and we would like to let the SEAS community and others know about them. To properly highlight them and their contributions, SEAS established the Engineering Hall of Fame in November of this year with a dinner and awards celebration at the Fairmont Hotel in Washington, D.C.

The Hall of Fame recognizes alumni who have made sustained and meritorious contributions to engineering, technology, or management during their careers. At its inaugural celebration, SEAS inducted nine alumni into the Hall of Fame: I. Gary Bard (MS '63), Gail E. Boggs (BS '48), William J. Ellenberger (BS '30, '34), Mark V. Hughes, III (BA '69, MS '77), Patrick J. Martin (MS '66, D.Sc. '72), Nicholas G. Paleologos (BS '69), Marjorie R. Townsend (BS '51), and David I.J. Wang (BS '51). Spencer S. Prentiss (BS '28) was inducted posthumously.

"These alumni demonstrate to all of us what is possible when a person dedicates himself to professional goals," said Dean Timothy Tong. "I look forward to sharing their stories with our current students, because I think they can be great motivators for young people."

SEAS welcomes nominations from all of our alumni. Anyone who would like to learn more about the Engineering Hall of Fame or its inductees or who would like to nominate a fellow alumnus/a should visit the SEAS website at: www.seas.gwu.edu/hall_of_fame.

SEAS Teams Up with U.S. Corporations

Pat Marolda (MEA '86) and Rolls-Royce have proved that an alumnus and his employer can work together to make things happen at a university.

When Marolda learned that SEAS was looking for a gas turbine engine to enhance its students' learning experience, he began working with the Rolls-Royce Heritage Trust in Indianapolis, Indiana, to identify and refurbish the 501-K5A industrial turbine, an engine valued at approximately \$1.3 million. Earlier last year, the engine was shipped to the National Crash Analysis Center at GW's Virginia Campus, and on June 28, 2006, it was formally unveiled there during a dedication ceremony attended by Marolda; Mr. Jim Guyette, president of Rolls-Royce North America; and other Rolls-Royce officials.

GW engineering students will use the gas turbine to develop a finite element computer model and conduct analysis in jet engine failure preventions, as well as for a range of other research efforts. They also will use digitized data from the 501-K5A to help create a generic engine model.

This partnership between SEAS and Rolls-Royce is just one example of the different relationships that the School has with various U.S. corporations. For example, SEAS has a long-standing relationship of a different nature with Science Applications International Corporation (SAIC). For nine years, SEAS has operated off-campus and cohort-style programs for SAIC employees from a number of different locations across the country. Over the course of the years, SEAS has helped educate approximately 270 SAIC employees. SEAS alumnus and former SAIC executive Mark Hughes has been instrumental in forging this relationship between the School and SAIC.

SEAS also has a nine-year relationship with Lockheed Martin Corporation. SEAS has already graduated 150 Lockheed Martin employees from its master's degree program in systems engineering. Beginning this past September, the School's Department of Engineering Management and Systems Engineering took the program nationwide. Currently, 400 Lockheed Martin employees are enrolled, with professors teaching in locations throughout California, New Mexico, and Colorado. Some of the classes are also beamed through video teleconferencing to Arizona, Hawaii, and Nebraska.





ASGHAR MOSTAFA

Million-Dollar Contributions Fuel Engineering Facility Initiative

EDITOR'S NOTE: This article was previously published in *By George!*, the official GW newspaper. It is reprinted below, with permission.

Mark Hughes (BA '69, MS '77) and Asghar Mostafa (BS '81, MS '82) have much in common—both men attended GW, both met their wives at the University, and both are committed to using their talents to help GW advance as a leader in science and engineering. In addition to giving their time—Mostafa to the School of Engineering and Applied Science National Advisory Council and Hughes as a University trustee—each has made a substantial contribution to the science and engineering building initiative.

"Mark and Asghar have shown tremendous leadership in making these important commitments at this early stage of the project, and I am grateful for their support," says School of Engineering and Applied Science Dean Timothy Tong. "Together with significant gifts from fellow alumni Simon Lee, Pat Martin, and Scott Amey, we are now in a strong position to make our dream of a new and improved engineering facility a reality."

Mostafa agrees. "For more than a year, we have been discussing how we can start a building project," he says. "If I help start things off with my effort, hopefully more people will join in and we can

go from talking to action." With his wife Holly Hartman, Mostafa made a \$1 million gift to support a new facility.

An entrepreneur whose career in telecommunications has followed an upward trajectory, Mostafa moved from his first job, with IBM, to the world of start-ups. In the past 15 years he has created several new companies; most recently, he funded a fiber optics firm called Vinci, which he sold in 2004. Mostafa attributes much of his success to the University. "I got a great foundation at GW," he says.

Hughes shares the vision of a first-tier engineering school at the University. "GW is on its way to becoming one of the world's great universities," he says. "And to be a great university today, you have to excel in science and engineering." Hughes notes that GW is uniquely positioned to educate scientists and engineers who are versed in public policy.

Like Mostafa, Hughes and his wife Susan made their gift—\$1.2 million—to kick-start a new science and engineering building. Recently retired from his position as president of the system and network solutions group at Science Applications International Corporation, Hughes has been actively involved with GW since the early 1990s. In 2003, he joined the University's Board of Trustees. GW, he says, has achieved world recognition in nuclear physics and several other technical fields, a solid basis for moving forward with the building initiative. "We have professors and alumni who have invented processes or devices from civil engineering to computer science that are

helping the world. The work we are doing here in science and engineering is one of the crown jewels of GW."

In Memorium

SEAS sadly announces the death of Dr. Spencer Scott Prentiss (BS '28), who passed away in November 2005, just weeks shy of what would have been his 100th birthday.

Prentiss received a scholarship to study at GW and then pursued graduate studies on scholarship at the Massachusetts Institute of Technology, earning his Ph.D. in 1931 in physical chemistry.

After working for the Linde Co. (Union Carbide), the DuPont Company, and the Office of Scientific Research and Development, Prentiss moved to Bartlesville, Oklahoma in 1946 to work for Phillips Petroleum Company. From 1955 through his retirement in 1969, he worked in the Phillips Patent Division. Over the course of his career, he received fourteen U.S. patents, published several papers in scientific journals, and co-authored the Office of Scientific Research and Development summary volume on the preparation and uses of oxygen during WWII.

After his retirement, Prentiss remained a member of the American Chemical Society and a fellow of the American Association for the Advancement of Science. Prentiss also had a lifelong passion for orchestra and chamber music and was active in a wide range of community activities in the Bartlesville area.



MARK HUGHES

Bill Westenhofer Receives Oscar Nomination

When the Academy for Motion Picture Arts and Sciences announced its nominees for the annual Academy Awards last winter, SEAS alumnus Bill Westenhofer (MS '95) was among the fortunate few whose talents are recognized with an Academy nomination.

Westenhofer was the visual supervisor on the team that created the visual effects for the movie, "The Chronicles of Narnia: The Lion, the Witch and the Wardrobe," and he and his team were among four teams nominated for the Academy's Achievement in Visual Effects Award for 2005. He also received similar nominations from the British Academy of Film and Television Arts, (BAFTA), the Visual Effects Society Awards, and the Saturn Awards.

Westenhofer, who studied the use of dynamics in physically based animation as a student in the Department of Computer Science, has worked on a number of other films, including: "Elf," "The Rundown," "Men in Black 2," "Cats & Dogs," "Stuart Little I and II," "Frequency," and "Babe: Pig in the City."

Thomas Horvath Named AIAA Engineer of the Year

Each year, the American Institute of Aeronautics and Astronautics (AIAA) recognizes one member of AIAA who has distinguished himself in some facet of aerospace engineering, and it awards him the prestigious AIAA Engineer of the Year Award. In 2006, the recipient of this national award was SEAS alumnus Thomas Horvath (MS '87).

Horvath distinguished himself in his role as technical project manager/lead for all Shuttle Return-to-Flight efforts within the Aerothermodynamics Branch at NASA/Langley, and he was selected as engineer of the year for his contributions to understanding the

Space Shuttle orbiter aero-thermodynamic phenomena. According to the citation on Horvath's award, his contributions were "critical to the Columbia accident investigation, and the safe entry of Discovery on the STS-114 Return-to-Flight mission."

Horvath has been a member of the Aerothermodynamics Branch at the NASA Langley Research Center for 19 years and has authored or co-authored 71 technical papers, including the AIAA best thermophysics paper in 2001.

SEAS Alumni Receive GW Awards

GW recognized three SEAS alumni in 2006 for their career achievements or service to the University and community. The GW Alumni Association bestowed its Alumni Service Award on Scott Amey (MS '75), and the GW Engineer Alumni Association (EAA) gave its Alumni Achievement Award to I. Gary Bard (MS '63) and its Service Award to Sean Walsh (MS '76).

Amey received the GWAA Service Award for his dynamic effort in building the SEAS Student Career Services Office and for his service and commitment to SEAS and to its National Advisory Council (NAC). Amey has been a member of the NAC since 2002 and began serving as the NAC chairman at the start of the 2006-07 academic year.

Amey has directed the SEAS Student Career Services Office on a strictly volunteer basis since fall 2004, contributing countless hours to help SEAS students get their careers started on the right track. He counsels students on internships and other professional opportunities and helps match their interests and areas of expertise with existing opportunities. Amey also critiques students' resumes and helps them with interview preparation; works to identify new opportunities for students; and seeks to build new relationships for the School with local businesses and government agencies. Through his outreach efforts, Amey

has identified 120 summer internship opportunities and 80 part and full-time opportunities for SEAS undergraduates and graduates, placing more than 75 students in positions around the country.

Scott and his wife Debbie have also been great supporters of SEAS. In November 2004, they created a challenge to all SEAS alumni: for every \$1,000 that an alumnus gave to support the SEAS Dean's Excellence Fund, Scott and Debbie would match it, up to \$50,000. The initiative raised over \$100,000 in unrestricted funds for the Dean's Excellence Fund, which provides support for scholarships, student projects, labs and equipment, and faculty research.

Sean Walsh received the EAA Service Award for his commitment to the EAA over a number of years. He has spent approximately ten years on the EAA Board, spanning two periods over three decades. During these stints on the Board he has chaired one or more committees—including the admissions committee—and has served as the EAA treasurer, vice president for two years, and president for two years.

Through his duties as president, Walsh sat on the GWAA and served as a representative of the EAA at the SEAS National Advisory Council. More recently, he also sat on the GW alumni committee for the 1976 class reunion celebrated during Colonials Weekend in October 2006. Walsh's additional contributions have included calling SEAS admitted students to answer questions they may have; helping current SEAS students with internships, job opportunities, and networking; and representing SEAS and the EAA as a volunteer judge at local science fairs.

Gary Bard (MS '63) received the EAA Engineer Alumni Achievement Award at the SEAS graduation celebration last May. Bard had a very successful 35-year career in electronics, communications, and computer science. He was the chief executive officer of five companies during his career and retired in 1998.

Among his accomplishments are the several patents that he holds in the field of computer display technology and analog to digital conversion, as well as his success in implementing a wholesale distribution system that provided for the stock control and distribution of every spare part of every component of every weapons system used by the U.S. Air Force. At the time, it was possibly the largest wholesale distribution system ever implemented.

Throughout his career Bard was, and remains, active in a wide range of community and other volunteer activities. He has been a member of the SEAS National Advisory Council for seven years and was its chairman for six of those years. Bard's commitment to SEAS goes beyond service and also includes a generous gift to endow a fund that supports an e-commerce curriculum at SEAS.

Meet Fred Kohloss: Honorary Alumnus

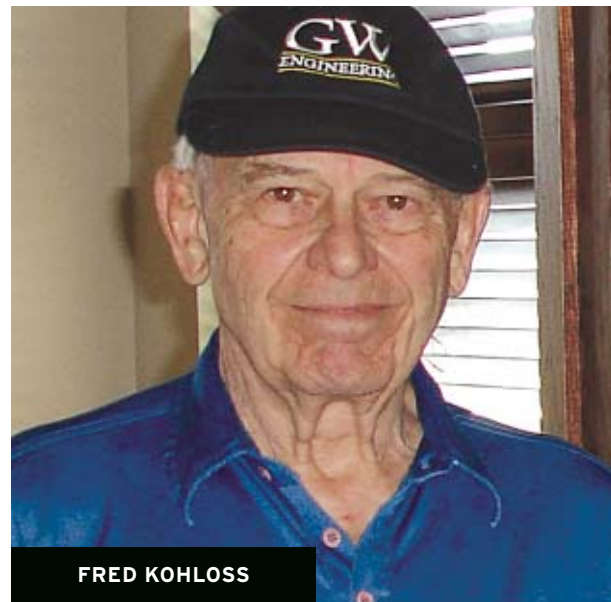
Last spring, Dean Timothy Tong presented GW law alumnus Fred Kohloss (JD '49) with a SEAS medal and a certificate granting him honorary status as a SEAS alumnus "in recognition of over sixty years of distinguished service to the

engineering profession and generous support of engineering education." In bestowing alumnus status on him, Dean Tong said, "Fred has been a loyal friend and generous supporter of SEAS for many years. I am pleased and proud to finally be able to officially claim Fred as our own now that he has status as an honorary SEAS alumnus."

Kohloss has mechanical engineering degrees from the University of Maryland and University of Delaware, and he taught classes at SEAS while attending law school. His original intent was to become a patent attorney, but he never took the bar exam and instead embarked on a distinguished career in engineering in the area of heating, ventilating, and cooling systems in construction.

His career has taken him from chief engineer of a mechanical contracting firm in Washington D.C., and Cleveland, to consulting engineer in Hawaii, to principal of Frederick H. Kohloss & Associates, Inc. from 1961 to 1991. In 1991 he merged his Hawaii Company into the Australia-based Lincolne Scott Group. He retired from the group in 2001, but continues to work part-time as an engineering consultant.

Kohloss has designed the mechanical services for many major projects in



Hawaii and elsewhere, including the Sheraton Waikiki Hotel, the Honolulu Kaiser Moanalua Medical Center, Grosvenor Center, Tucson Newspaper, and Clark Air Base and Hospital in the Philippines. Over these years, he operated branch offices of his Hawaii engineering firm in Guam, Australia, Tucson, Cleveland, San Francisco, and Denver. He has been, and remains, active in many professional organizations and technical advisory services, and he has received many awards throughout his distinguished career.

ANNOUNCEMENTS

Be in the Know

The GW Colonial Cable, sent monthly through e-mail, provides updated news on what is happening at GW. For SEAS news and events, click on the "Engineering" tab. If you do not currently receive the update, e-mail seasalum@gwu.edu to subscribe.

Linked In

SEAS has partnered with *LinkedIn* to provide an independent, online networking service for SEAS alumni. You can use it as a tool for business networking, job searches, or simply for locating other members of the SEAS community. To learn more or join the network, visit www.seas.gwu.edu/online_networking.

New Bay Area Alumni Group

SEAS is forming a Bay Area/Silicon Valley GW engineering alumni group, and we are seeking engineering alumni who want to get involved. To get involved or help plan activities and events, contact Remy Ntshaykolo (MEM '93) (remynt@hotmail.com) or the SEAS Office of Advancement and Alumni Programs (seasalum@gwu.edu).

Get Involved

Are you looking for ways to re-connect with SEAS? We have lots of ideas, and we share them with you at www.seas.gwu.edu/get_involved. Go ahead: check it out and see which ways you like.

Upcoming EAA Events

Resume Critique Event

Young Alumni Happy Hour

Basketball Tailgate & Game Watching

Science Fair Judging

Visit www.seas.gwu.edu/events for more information.

Happenings

Achal Achrol, BS (computer science) '03, won a Soros Fellowship for the 2006-07 academic year. He is a first-year MD candidate at Stanford Medical School.

Paige Atkins, MS (engineering administration) '89, has been selected as the Defense Information Systems Agency's executive in charge of the Defense Spectrum Organizations.

David J. Belanger, MS (engineering management) '94, has been promoted to director of quality and technical services at Northrop Grumman Newport News. He is responsible for the administration, maintenance and monitoring of the shipyard's quality management systems and technical support processes.

Taft Broome, MS '68, D.Sc. '72 (civil engineering), a professor at Howard University, served as the Martin Luther King Visiting Professor at MIT, Engineering Systems Division during the 2005-06 academic year.

Gennaro Colabatistto, MS (electrical engineering) '96, has joined XVionics, a global technology company, as chief executive officer. Colabatistto will take the lead in developing the company's strategic roadmap.

Carolyn Fritz, MS (computer science) '89, has been appointed the chief executive officer of Allylix, Inc., a biotechnology company.

Michael Griffin, MS (civil engineering) '98, was confirmed as the NASA Administrator in April 2005.

Charles M. Hess, MS (engineering management) '79, joined The Shaw Group, Inc. in 2005 as senior program director within Shaw's Hurricane Katrina Recovery Task Force.

Julia Hochberg, BS (mechanical engineering) '99, has been named the vice president for strategy and planning at Epsilon.

Cameron Hurst, MS '87, has joined Riverside Bank as executive vice president and chief information officer.

Hughes Chairman and CEO, **Pradman Kaul, BS (electronics) '67**, was named Executive of the Year by the Tech Council of Maryland (TCM) in April 2005.

John Scott Kirby, MS (operations research) '93, has been promoted to president of US Airways.

Vincent Lee-Thorp, MS (engineering administration) '62, has published *Washington Engineered*, a look into the engineering of Washington, D.C. In his book—which blends history, sociology, engineering, and science—Lee-Thorp examines how revolutionary inventions and their creators changed everyday life in the city.

Amrith K. Mago, BS (applied science and technology) '03, and Johann F. Aakre, BS (civil engineering) '03, were married August 6, 2005 in Bloomingdale, Illinois, at a ceremony filled with GW friends and family.



Alireza Mahmoodshahi, D.Sc. (electrical engineering) '88, has been appointed chief technology officer of COLT Telecom Group plc.

Dr. Sanjeev R. Malushte, MS (engineering management) '98, has been elected a Bechtel Fellow in recognition of his technical ability and achievements.

The American Public Works Association has published an oral history of **James Martin, P.E., BS (civil engineering) '50**. It is Number 14 in a series of oral histories of leaders in the public works profession. The interview covers his career in public works and civil engineering since his graduation from GW.

John McCormack, MS (engineering management) '93, has joined Applied Identity as senior vice president of technology, with responsibility for all of engineering and product management.

Capt. Angus D. McEachen, USN, MEA (engineering administration) '65, has been elected president of the board of trustees at The Children's Museum of Memphis. He has served on the museum's board of trustees since 2003.

Kenneth W. Meeks, D.Sc. (civil engineering) '97, has been promoted to chair of the Department of Civil and Environmental Engineering at Tri-State University in Angola, Indiana.

Franklin Rowland, MS '87, has been promoted to the rank of colonel in the U.S. Army.

David A. Saperstein, BS (electrical engineering) '83, has joined the Scientific Advisory Board of Visient Therapeutics. Dr. Saperstein is a practicing ophthalmologist and an Associate Professor of Ophthalmology at the University of Washington in Seattle.

Christopher Scolese, MS (electrical engineering) '82, has been named NASA's chief engineer. As chief engineer Scolese is responsible directly to the

administrator for the overall review and technical readiness of all NASA programs.

Elias Shams, MS (electrical engineering) '96, has been named chief executive officer for Searchles.

John Spencer, D.Sc. (structural engineering) '89, has been appointed director of the Office of Marine Safety at the National Transportation Safety Board.

Richard A. Spires, MS (electrical engineering) '87, has been appointed the chief information officer of the Internal Revenue Service.

Leonard Tchuindjo, D.Sc. (systems engineering) '05, won the Eastern Finance Association's best Derivatives Paper Award for 2006 with his paper "Modeling Credit-Risky Bonds with Correlated-Factor Models", co-authored with GW business professor Robert Savickas.

Alan Wade, MS (electrical engineering) '78, has joined the board of directors of SafeBoot as an independent member.

Christopher J. Wiernicki, MS (structural engineering) '83, has been appointed president and chief operating officer of ABS Houston.

Thomas P. Wilson, MEA (engineering administration) '90, has been promoted to group service manager at Herbert, Rowland & Grubic, Inc.

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GW's planned giving program offers you a variety of opportunities to combine your financial and estate planning goals with your desire to support the School of Engineering and Applied Science. Through a life-income gift such as a charitable gift annuity, you can receive guaranteed income for your lifetime (and that of a spouse, if desired) while also leaving a significant future legacy to SEAS. Other planned giving arrangements provide future support through provisions in a will, living trust, or IRA.

Help advance the educational mission of SEAS and create a personal legacy to benefit future students—while also enjoying important tax benefits.

To learn more about planned giving opportunities at GW, please contact:

Douglas Honker
Executive Director of Advancement
School of Engineering and Applied Science
202-994-4121
dhonker@gwu.edu

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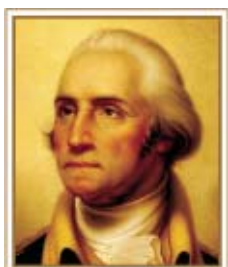
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