

THE GEORGE WASHINGTON UNIVERSITY SYNERGY

SCHOOL OF
ENGINEERING
& APPLIED SCIENCE

62

SEAS STUDENTS
IN STUDY ABROAD
PROGRAMS IN 2016



6

YEARS IN A ROW
OF INCREASED
PHILANTHROPIC GIVING



\$13.3

MILLION IN SEAS RESEARCH
EXPENDITURES IN 2016

Moving in the
Right Direction

Records, Trends, and
the Outlook for SEAS



Evergreen

No matter the time of year, students can enjoy the green walls built into common areas in GW's new Science and Engineering Hall.

Contents



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SYNERGY

SPRING 2017

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COVER STORY:

Moving in the Right Direction: Records, Trends, and the Outlook for SEAS

by Dean David S. Dolling

SEAS DEPARTMENTS

STUDENT PROFILE: Connor Roberts

ALUMNUS PROFILE: Rodolfo "Rudy" Rodriguez

NEWS

FACULTY

STUDENTS

ALUMNI

CLASS NOTES

PROFILE**Chair:** Igor Efimov

202-994-3740

www.bme.seas.gwu.edu**Undergraduate students:** 228**Graduate students:** 49**Annual research expenditures:** \$1.2 million**FACULTY**

Igor Efimov, PROFESSOR AND FELLOW OF HRS, AHA, AND AIMBE

Emilia Entcheva, PROFESSOR AND FELLOW OF AIMBE

Matthew Kay, ASSOCIATE PROFESSOR

David Lee, ASSOCIATE PROFESSOR

Zhenyu Li, ASSOCIATE PROFESSOR

Murray Loew, PROFESSOR AND FELLOW OF IEEE AND AIMBE

Chung Hyuk Park, ASSISTANT PROFESSOR

Jason Zara, ASSOCIATE PROFESSOR

Vesna Zderic, ASSOCIATE PROFESSOR

RESEARCH AREAS**BIOMEDICAL IMAGING**

Efimov, Entcheva, Kay, Li, Loew, Zara, Zderic

CARDIOVASCULAR ENGINEERING

Efimov, Entcheva, Kay

CELL & TISSUE ENGINEERING

Entcheva, Lee

MEDICAL INSTRUMENTATION

Efimov, Entcheva, Li, Zderic, Zara

ROBOTICS AND AUTOMATION

Entcheva, Li, Park

Shedding Light on the Matter

Anti-cancer drugs can offer hope of an effective treatment for millions of cancer patients, but they also can carry the risk of side effects, particularly cardiac side effects. Testing for these side effects is essential, but it is a lengthy and expensive process, and pharmaceutical companies are eager to find ways to speed it up and reduce costs.

This is where the pioneering work that Dr. Emilia Entcheva is doing may prove very helpful. Dr. Entcheva's lab studies problems related to electrical activity in the heart, and she is developing a technique to expedite researchers' ability to observe electrical activity across cardiac cells, including activity that can cause arrhythmias (abnormal heart rhythms), which can be lethal. She has taken a unique approach to it, borrowing an opto-genetic technique that is used more commonly in neuroscience.

Unlike traditional electrical methods of sensing and stimulating cell activity, optical methods allow researchers to study the activity over millions of cells simultaneously, thereby speeding up their observations and understanding. But heart cells are not light-sensitive, so researchers must first find a way to make them sense and respond to light. By genetically manipulating the cells with light-sensitive proteins from algae, they can make the cells respond to light.

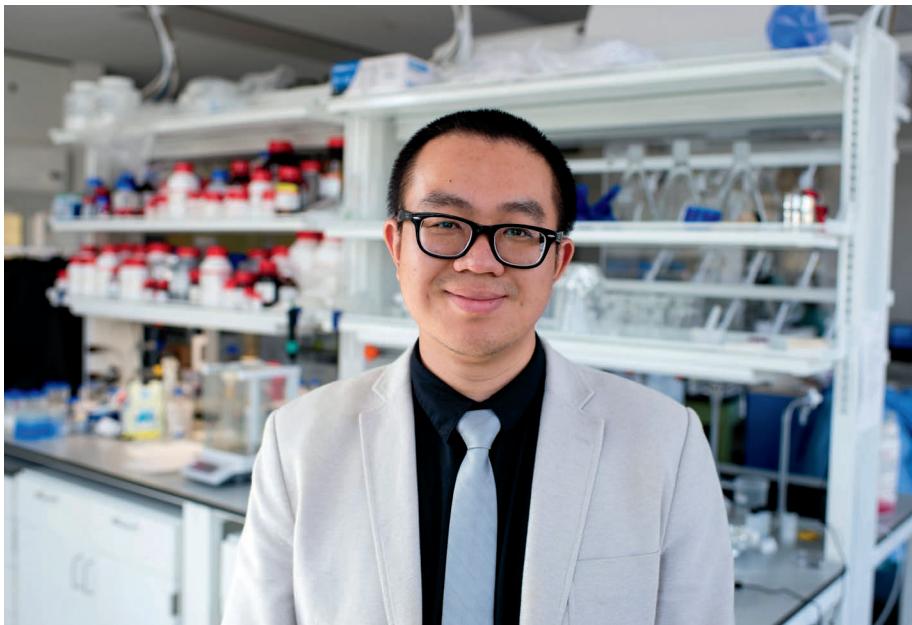
"In neuroscience, this technique has exploded and enhanced our ability to understand brain circuitry," claims Dr. Entcheva. "These opto-genetic methods allow one to very selectively manipulate only certain types of neurons to understand their function. So our lab has extended this to cardiac research."

Since people can react differently to the same drug, Dr. Entcheva's lab also is developing technology to facilitate personalized testing—or what she calls "my-heart-in-a-dish" testing platforms. Skin or blood cells are taken from the patient, transformed into adult stem cells, and then differentiated into cardiac cells.

"Using our optical means, we can characterize these newly developed cardiac cells in a way that wasn't possible before," Dr. Entcheva explains. "We can make new heart cells from the person's own blood, study them to see how they would react to a new drug, and test to see which therapy would work best for them."

Her team has had a number of successes in their research, including two recent studies. One study with Dr. Gil Bub of McGill University showed that they could use light to steer electrical waves in the heart in a way that no one had shown before. Used with the right applications, it could be a very powerful way to control arrhythmias. The other study, which her student Aleks Klimas spearheaded, demonstrated the power of their opto-genetics approach to drug testing, and it has sparked interest in the pharmaceutical industry.





The Promise of Photo-Catalysts

Is your drinking water safe? That question usually causes people to think of problems with lead, nitrate, or other conventional organic or microbial contaminants. But a new class of contaminants, called emerging contaminants, needs to be considered, too.

Emerging contaminants include pharmaceuticals and personal care products, among other examples, and according to the Water Quality Association, the potential risks they pose to human health are not yet fully understood. Conventional water treatment methods are not effective in removing them from the water supply, so to mitigate their risks environmental engineers like Dr. Danmeng Shuai are hard at work seeking new methods to treat water.

Most of the methods being studied have big drawbacks, which range from high operational costs, to intensive energy and chemical consumption, to low efficiency. But Dr. Shuai believes that photo-catalysis could provide a solution, without the problems inherent in other approaches.

"My research group is using innovative nanomaterials, such as the photo-catalyst graphitic carbon nitride, to remove emerging contaminants and promote a sustainable water supply," he says.

He explains that graphitic carbon nitride works as a photo-catalyst to harvest light and activate oxygen in the air; the oxygen then oxidizes the emerging contaminants to remove them. Because photo-catalysts use renewable solar energy and oxygen in the air and they require no additional efforts to destroy the contaminants, Dr. Shuai believes they can be the basis for a sustainable and very promising process. They are low-cost relative to other methods and avoid the safety hazards associated with processes that use strong oxidants such as hydrogen peroxide or ozone.

Despite the promise of photo-catalysts, their molecular scale interaction with the contaminants is still largely unknown, and some wet lab experiments cannot capture those interactions in detail. So Dr. Shuai and his colleague in the chemistry department create molecular simulations to provide insights on the materials and their interactions with the contaminants.

"Many other studies have already shown that photo-catalysts can remove emerging contaminants, but we want to use graphitic carbon nitride to optimize the photo-catalytic treatment," he states. "Some of the photo-catalysts that other researchers are using are only reactive under ultraviolet light, but UV light only contributes to four percent of solar energy. Our material can potentially harvest more than 40 percent of solar energy, so it will increase the sustainability for water treatment."

PROFILE

Chair: Majid Manzari
202-994-4901
www.cee.seas.gwu.edu
Undergraduate students: 83
Graduate students: 49
Annual research expenditures: \$551,000

FACULTY

Arzhang Angoshtari, ASSISTANT PROFESSOR
Sameh Badie, PROFESSOR
Leila Farhadi, ASSISTANT PROFESSOR
Samer Hamdar, ASSOCIATE PROFESSOR
Muhammad Haque, PROFESSOR
Russell Hemley, RESEARCH PROFESSOR
Tianshu Li, ASSOCIATE PROFESSOR
Zhenxian Liu, ASSOCIATE RESEARCH PROFESSOR
Majid Manzari, PROFESSOR
Rumana Riffat, PROFESSOR
Kim Roddis, PROFESSOR
Danmeng Shuai, ASSISTANT PROFESSOR
Pedro Silva, ASSOCIATE PROFESSOR

RESEARCH AREAS

ENVIRONMENTAL AND WATER RESOURCES ENGINEERING
Farhadi, Riffat, Shuai

MATERIALS
Hemley, Li

MECHANICS
Angoshtari, Manzari

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

TRANSPORTATION SAFETY ENGINEERING
Hamdar

PROFILE

Chair: Robert Pless
202-994-7181
www.cs.seas.gwu.edu
Undergraduate students: 187
Graduate students: 445
Annual research expenditures: \$3.7 million

FACULTY

Xiuzhen "Susan" Cheng, **PROFESSOR**
Hyeong-Ah Choi, **PROFESSOR**
Mona Diab, **ASSOCIATE PROFESSOR**
James Hahn, **PROFESSOR**
Rachelle Heller, **PROFESSOR**
Lance Hoffman, **DISTINGUISHED RESEARCH PROFESSOR AND FELLOW OF ACM**
Claire Monteleoni, **ASSISTANT PROFESSOR**
Bhagirath Narahari, **PROFESSOR**
Gabriel Palmer, **ASSOCIATE PROFESSOR**
Robert Pless, **PROFESSOR**
Rahul Simha, **PROFESSOR**
Poorvi Vora, **PROFESSOR**
Timothy Wood, **ASSISTANT PROFESSOR**
Abdou Youssef, **PROFESSOR**
Nan Zhang, **ASSOCIATE PROFESSOR**

RESEARCH AREAS

ALGORITHMS AND THEORY

Cheng, Choi, Youssef, Zhang

ARTIFICIAL INTELLIGENCE AND ROBOTICS

Cheng, Diab, Monteleoni, Pless, Zhang

BIOINFORMATICS AND BIOMEDICAL COMPUTING

Cheng, Hahn, Simha

COMPUTER SECURITY AND INFORMATION ASSURANCE

Cheng, Choi, Hoffman, Narahari, Simha, Vora, Zhang

DIGITAL MEDIA

Hahn, Heller, Pless, Vora, Youssef

NETWORKING AND MOBILE COMPUTING

Cheng, Choi, Narahari, Simha

PERVERSIVE COMPUTING AND EMBEDDED SYSTEMS

Cheng, Narahari, Simha

SEARCH AND DATA MINING

Youssef, Zhang

SOFTWARE ENGINEERING AND SYSTEMS

Narahari, Palmer, Wood



Extreme Imaging

Cameras have become ubiquitous. Security cameras increasingly dot our landscapes, and smart phones mean that most of us have a camera at the ready at all times.

Dr. Robert Pless foresees the myriad beneficial applications of the images these cameras capture, and he is capitalizing on them to help address national needs and social justice issues.

"The social goal is to use the fact that there are so many cameras around the world in so many people's hands and they see so many important things," Dr. Pless argues. "By connecting them to each other or central databases we can find new ways of attacking really important problems."

One of the problems that he and his research group have been working on is an app called Traffickcam, which is now being used to help law enforcement track the locations of hotels used in sex-trafficking of minors. Sex-traffickers often take photos of these children in hotels and post them online. Having detailed photos of hotel rooms across the country that law enforcement can match against the traffickers' photos can help law enforcement find the hotels where victims may have been taken.

Traffickcam allows travelers to take photos of their hotel rooms and upload them to the database that law enforcement uses. Since it was launched six months ago, travelers have contributed more than two million photos.

Another longer-term project that Dr. Pless works on takes in vast numbers of images—far more than the Traffickcam project—to record how the world has been changing. For the past 10 years, AMOS (Archive of Many Outdoor Scenes) has logged images from every publicly available webcam that his group could find. It records one photo every half hour from each of the approximately 35,000 cameras posted around the world on campuses, beaches, streets, and more. It currently has a library of one billion images.

What researchers can learn from this library is almost limitless. Dr. Pless currently is using the images to discover, for example, how many more people are using bike lanes in Washington, D.C., and how vegetation is changing over time in other areas. To do this successfully, he develops algorithms that can manipulate the vast quantities of data stored in extremely large photo collections, so new information can be learned from them.

"I'm exploring the limits of computational photography, which is when you have a computer attached to the camera taking pictures," says Dr. Pless. "What's unique about my research compared to my colleagues working in computational photography is that I think about extreme imaging questions, whether it's time lapses over huge amounts of time or pictures from huge numbers of cameras."

Working Remotely

Dr. Roger Lang's relationship with NASA goes back many years. He specializes in electromagnetics and remote sensing, and over the years, he has worked with NASA on remote sensing projects that use satellites to look at the earth and determine different properties of the soil, vegetation, oceans, ice, and the atmosphere. He has covered it all.

One particular project, however, stands out for him. For 10 years now he has worked with NASA and its microwave satellite instrument *Aquarius* to measure the surface salinity of the ocean. Oceanographers, too, have been taking measurements for years, but they take only point measurements, whereas this satellite provides complete measurements of the entire ocean every seven days, according to Dr. Lang.

"Various effects of climate change can be determined by knowing the salinity of the ocean, such as the decrease in salinity due to melting ice," explains Dr. Lang. "The bottom line of this is for NASA to understand the effects of climate change, and they want me to make this measurement for them."

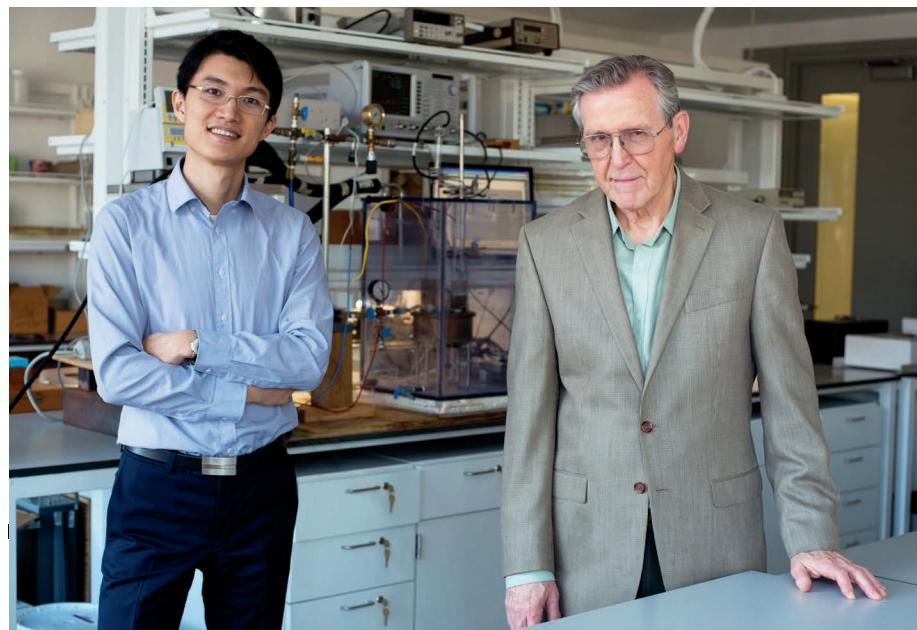
Dr. Lang explains that natural radiation comes up from the surface of the ocean and that this emission depends on the salinity of the ocean at its surface and the ocean's surface temperature. If the satellite can remotely determine the temperature of the ocean's surface, which it can do by using infrared technology, then from the radiation it receives from the surface, it can provide a very accurate measurement of the salinity. This is a two-stage process in which the salinity and the temperature change the refractive index of the water and it, in turn, changes the amount of radiation that the ocean emits.

"I'm going to generate a relationship between the refractive index and the salinity and temperature of the sea water. NASA will use that relationship in its algorithm to sense the salinity from space," Dr. Lang says.

To do this, he has devised a method using a microwave cavity that is resonant at the frequency of the satellite measurements. By sweeping the cavity over frequency, he can measure the resonant frequency of the cavity and the width of the resonant curve. Then he puts seawater into the cavity through a glass tube. This causes a change in the resonant frequency, and a change in the width of the curve. From those changes he can determine the refractive index of the water.

This is no small task experimentally. Dr. Lang's team had to figure out how to add seawater through a tube that is 0.1 millimeter in diameter. Since seawater won't go into such a small tube, they had to use nitrogen to push the water into the tube. Then they had to find a way to keep dirt from getting into the tube and clogging it up. And the list goes on.

But Dr. Lang is not deterred. "We've had to learn how to understand these problems and be able to overcome them," he muses. But the struggle has been worthwhile. "The work we're doing could make these measurements more accurate not just for our applications, but also for other purposes as well," he concludes.



PROFILE

Chair: Suresh Subramaniam
202-994-6083

www.ece.seas.gwu.edu

Undergraduate students: 87

Graduate students: 265

Annual research expenditures: \$2.5 million

FACULTY

Shahrokh Ahmadi, **TEACHING PROFESSOR**

Lawrence Bennett, **RESEARCH PROFESSOR AND FELLOW OF APS**

Robert Carroll, **PROFESSOR**

Edward Della Torre, **PROFESSOR AND FELLOW OF IEEE AND APS**

Milos Doroslovacki, **ASSOCIATE PROFESSOR**

Tarek El-Ghazawi, **PROFESSOR AND FELLOW OF IEEE**

Kie-Bum Eom, **PROFESSOR**

Amir Etemadi, **ASSISTANT PROFESSOR**

Hernan Figueroa, **PROFESSOR OF PRACTICE**

Robert Harrington, **PROFESSOR AND FELLOW OF IEEE**

Hermann Helgert, **PROFESSOR**

Howie Huang, **ASSOCIATE PROFESSOR**

Can Korman, **PROFESSOR**

Nicholas Kyriakopoulos, **PROFESSOR**

Tian Lan, **ASSOCIATE PROFESSOR**

Roger Lang, **PROFESSOR AND FELLOW OF IEEE**

Ahmed Louri, **PROFESSOR AND FELLOW OF IEEE**

David Nagel, **RESEARCH PROFESSOR**

Vikram Narayana, **ASSISTANT RESEARCH PROFESSOR**

Ergun Simsek, **ASSISTANT PROFESSOR**

Volker Sorger, **ASSISTANT PROFESSOR**

Suresh Subramaniam, **PROFESSOR**

Guru Venkataramani, **ASSOCIATE PROFESSOR**

Mona Zaghloul, **PROFESSOR AND FELLOW OF IEEE**

RESEARCH AREAS

COMMUNICATIONS AND NETWORKS

Doroslovacki, Helgert, Lan, Louri, Subramaniam

COMPUTER ARCHITECTURE

AND HIGH-PERFORMANCE COMPUTING

El-Ghazawi, Huang, Louri, Narayana, Venkataramani

ELECTRIC POWER AND ENERGY

Etemadi, Figueroa, Harrington

APPLIED ELECTROMAGNETICS

Bennett, Della Torre, Korman, Lang, Simsek, Sorger, Zaghloul

MEMS/NEMS, ELECTRONICS, AND PHOTONICS

Ahmadi, Korman, Louri, Nagel, Simsek, Sorger, Zaghloul

SIGNAL AND IMAGE PROCESSING, SYSTEMS, AND CONTROLS

Carroll, Doroslovacki, Eom, Harrington, Kyriakopoulos

PROFILE

Chair: Thomas Mazzuchi
202-994-2353

www.emse.seas.gwu.edu

Undergraduate students: 119

Graduate students: 879

Annual research expenditures: \$1.1 million

FACULTY

Hernan Abeledo, **ASSOCIATE PROFESSOR**

Joseph Barbera, **ASSOCIATE PROFESSOR**

David Broniatowski, **ASSISTANT PROFESSOR**

Jonathan Deason, **PROFESSOR**

Royce Francis, **ASSISTANT PROFESSOR**

Erica Gralla, **ASSISTANT PROFESSOR**

Thomas Mazzuchi, **PROFESSOR**

Joost Reyes Santos, **ASSOCIATE PROFESSOR**

Shahram Sarkani, **PROFESSOR**

Ekundayo Shittu, **ASSISTANT PROFESSOR**

Zoe Szajnfarber, **ASSOCIATE PROFESSOR**

J. Rene van Dorp, **PROFESSOR**

RESEARCH AREAS**CRISIS, EMERGENCY, AND RISK MANAGEMENT**

Barbera, Broniatowski, Gralla, Santos, van Dorp

ECONOMICS, FINANCE, AND COST ENGINEERING

Santos, Shittu, van Dorp

ENGINEERING AND TECHNOLOGY MANAGEMENT

Deason, Sarkani, Shittu, Szajnfarber

ENVIRONMENTAL AND ENERGY MANAGEMENT

Deason, Francis, Shittu

KNOWLEDGE AND INFORMATION MANAGEMENT

Broniatowski

OPERATIONS RESEARCH

Abeledo, Gralla, Mazzuchi, Sarkani, Shittu, van Dorp

SYSTEMS ENGINEERING

Broniatowski, Gralla, Mazzuchi, Santos, Sarkani, Shittu, Szajnfarber, van Dorp

Better Decision Making

Some models of decision making assume humans have perfect information, but Dr. Erica Gralla knows that is never the case when working with complex systems. And since better models of decision making can dramatically improve system performance and outcomes, she is hard at work developing models to better reflect the structures and context of various systems in which decisions are made—including the (imperfect) information that is really available to decision-makers.

One system she studies is disaster response supply chains. After a hurricane strikes or an earthquake occurs, for example, responders at warehouses need to know what supplies the affected people need, where the cargo is most needed, and which routes are open. All of these are supply chain questions. Multiply these types of decisions over the many people and organizations that are part of a disaster response system, and optimal decision making quickly becomes very complicated.

According to Dr. Gralla, mega-retailers like Amazon and Walmart are very good at supply chain management, but their models assume a particular system structure that just does not fit in a disaster response situation.

"You couldn't use Amazon's model for disaster response," she says. "For one thing, our goals are different. We're not trying to minimize cost. In addition, there's no single central authority directing all aspects of the response, so we can't just use a model to find an optimal decision and expect it to be implemented by all responders."

Instead of starting with those models, she tries to understand the context and structure of each system—in this case, the evolving goals and decentralized structure—and then figure out the right decision making approach based on that system. So she developed a decision support tool for disaster response transportation to help planners with just these sorts of supply chain challenges, one that works with imperfect information and limited decision authority.

"This problem sounds easy but it's not that easy to make sure you're actually doing the most good," maintains Dr. Gralla. "These supply chain decisions add up to whether or not someone gets service, and this can mean prolonging suffering unnecessarily."

Dr. Gralla studies other decision making problems, too. She is working currently on a project to design the right division of labor across teams working on spacecraft design, and on a project to support decisions about the best ways to leverage development aid to strengthen the Ugandan agricultural supply chain systems. As she explains, all of these problems relate to understanding the system's context and structure and how to use the structure to enable people to make better decisions.

"Most of my field thinks about telling you what decision to make, and I don't always think that that's the right answer," she contends. "I think about how we set up the information flow and coordination and leave the decision to a person who's in a better position to understand things that a model will never understand, in some cases leaving room for intuition, in some cases leaving room for changing priorities."





At the Crossroads of Science

Dr. Elias Balaras conducts research in multi-physics simulations in a variety of fluid mechanics problems. Stated another way, he uses powerful super-computers and advanced math models to tackle challenging fluid flow problems in biology and engineering.

Fluid mechanics studies how liquids and gases behave in motion under the action of internal and external forces—think of air flows around an airplane wing, or water flows around a ship's hull, or even how blood flows through veins and arteries.

"Multi-physics simulations are at the boundaries of scientific computing, numerical analysis, and whatever discipline you're looking at—in my case, fluid mechanics," says Dr. Balaras. "You have to take advantage of advancements in all of these areas to be able to do state-of-the-art research."

And that is what he and his research team are doing here at SEAS. The project he is most proud of is his work to model and optimize the design of an implantable graft used in aortic valve by-pass surgery to improve the outcomes for elderly patients with aortic valve disease (AVD). AVD is caused by calcification that decreases the aortic valve orifice. It is a dangerous condition that reduces life expectancy and quality of life for patients.

Many patients with AVD can be treated successfully through aortic valve replacement surgery, but a large group of patients who are not healthy enough to undergo open heart surgery are typically left untreated. These patients can now benefit from a much less invasive procedure that does not require stopping the heart. This alternative procedure uses a small tube attached to the apex of the heart on one end and the descending aorta on the other, allowing some of the blood to flow through the heart's natural valve and some to flow through the tube so the heart does not have to work so hard.

The idea for the aortic valve bypass procedure is not new, but technical issues, including a good understanding of the procedure's impact on the local circulation, were an obstacle in its widespread use. Working with collaborator Dr. James Gammie, chief of the Division of Cardiac Surgery at the University of Maryland's School of Medicine, Dr. Balaras created computational models of a realistic heart and performed the operation virtually, studying how the circulation was impacted by the graft. They then optimized the geometry of the graft using the computational model.

"The optimized graft is routinely used in aortic valve bypass surgeries by Dr. Gammie's team," states Dr. Balaras. He continues, "I'm trained as an applied mathematician, but when I find something challenging I'll try to push the boundaries to find something that will have an impact on people's lives, like this."

PROFILE

Chair: Michael Plesniak
202-994-6749

www.mae.seas.gwu.edu

Undergraduate students: 249

Graduate students: 152

Annual research expenditures: \$4.3 million

FACULTY

Elias Balaras, **PROFESSOR**

Lorena Barba, **ASSOCIATE PROFESSOR**

Philippe Bardet, **ASSOCIATE PROFESSOR**

Kartik Bulusu, **ASSISTANT RESEARCH PROFESSOR**

Ken Chong, **RESEARCH PROFESSOR AND FELLOW OF ASME, AAM AND SEM**

Andrew Cutler, **PROFESSOR**

David Dolling, **PROFESSOR AND FELLOW OF AIAA AND ROYAL AERONAUTICAL SOCIETY (UK)**

Charles Garris, **PROFESSOR AND FELLOW OF ASME**

Stephen Hsu, **PROFESSOR AND FELLOW OF ASME**

Michael Keidar, **PROFESSOR AND FELLOW OF APS**

Saniya LeBlanc, **ASSISTANT PROFESSOR**

James Lee, **PROFESSOR AND FELLOW OF ASME**

Taeyoung Lee, **ASSOCIATE PROFESSOR**

Megan Leftwich, **ASSISTANT PROFESSOR**

Yongsheng Leng, **ASSOCIATE PROFESSOR**

Chunlei Liang, **ASSOCIATE PROFESSOR**

Michael Plesniak, **PROFESSOR AND FELLOW OF ASME, AIAA, AAAS, AIMBE AND APS**

Kausik Sarkar, **PROFESSOR AND FELLOW OF ASME, ASA, AIMBE AND APS**

Yin-Lin Shen, **PROFESSOR**

Murray Snyder, **PROFESSOR**

Santiago Solares, **ASSOCIATE PROFESSOR**

Adam Wickenheiser, **ASSISTANT PROFESSOR**

Lijie "Grace" Zhang, **ASSOCIATE PROFESSOR**

RESEARCH AREAS

AEROSPACE ENGINEERING

Cutler, Dolling, Garris, Keidar, T. Lee, Plesniak, Wickenheiser

BIOMEDICAL ENGINEERING

Balaras, Bulusu, Keidar, J. Lee, Leftwich, Liang, Plesniak, Sarkar, Zhang

DESIGN AND MANUFACTURING OF MECHANICAL AND AEROSPACE SYSTEMS

Garris, Leng, Shen

FLUID MECHANICS, THERMAL SCIENCE, AND ENERGY

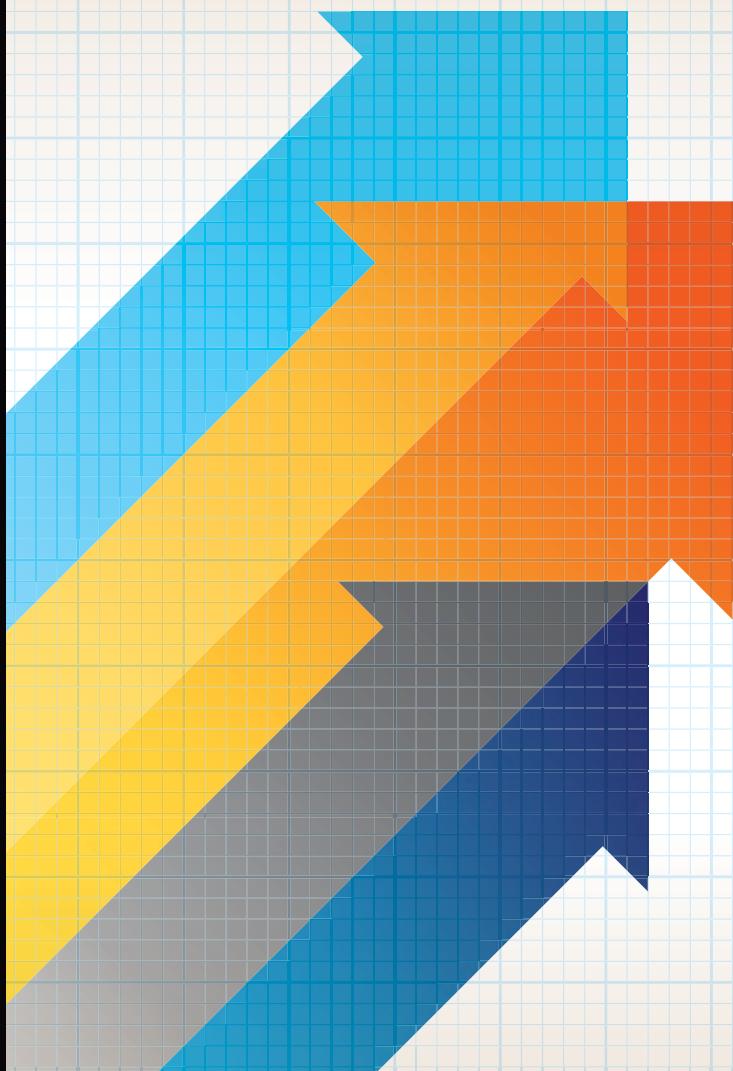
Balaras, Barba, Bardet, Bulusu, Cutler, Dolling, Garris, Hsu, Keidar, LeBlanc, Leftwich, Liang, Plesniak, Sarkar, Snyder, Wickenheiser

MECHATRONICS, ROBOTICS, AND CONTROLS

J. Lee, T. Lee, Wickenheiser

SOLID MECHANICS AND MATERIALS SCIENCE

Chong, Hsu, LeBlanc, J. Lee, Leng, Solares, Zhang



COVER STORY:

Moving in the Right Direction

Records, Trends, and the Outlook for SEAS

by Dean David S. Dolling



I am not a native Texan but I lived there long enough to learn many of the wonderful, colorful idioms and one-liners that Texans use to express themselves.

Over the years, I've found myself borrowing a few that I particularly like and using them when the occasion fits.

One of my favorites is "it ain't braggin' if it's true." I don't like to hear someone brag any more than you probably do, and I don't like to be the person bragging, but I do think it's appropriate to share the good news of our success. So, I'm willing to risk appearing to be "braggin'" a little to get the story out about SEAS.

For the past several years, I've been telling you that SEAS is on a roll, and it is. We've seen good, strong trends in the data that indicate the health of the school: in enrollment numbers, in sponsored research dollars, in program growth, in alumni engagement, and in other areas. And we've set several records along the way.

This year is no exception. It's another year of a general upward trend in these data and another year with several new records.

Something else also is happening, which the data don't necessarily capture. That something is synergy. We're all familiar with the concept, the idea that the interaction of various elements can create a whole that is greater than the sum of its parts. At SEAS, everyone who contributes to the success of the school is an "element" of that synergy.

The SEAS faculty are a key element, of course. They contribute in so many ways, but research—along with teaching—is obviously central. Across the school, they are building well-respected and well-funded research programs. A simple statistic helps make the point: SEAS research expenditures have nearly doubled since fiscal year 2012, reaching \$13.3 million in fiscal year 2016. And for the first six months of the current fiscal year they are up an additional 16 percent.

SEAS research expenditures have nearly doubled since fiscal year 2012, reaching \$13.3 million in fiscal year 2016.

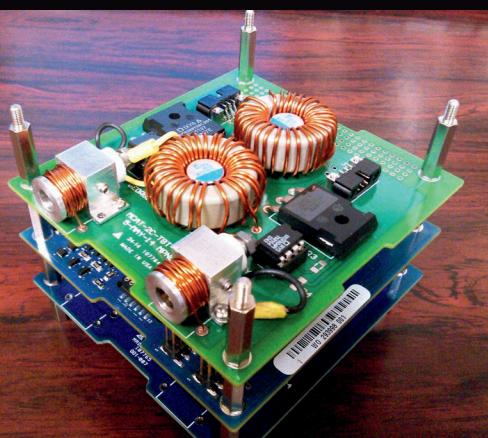
Seeing faculty win new grants or jumpstart new research programs is gratifying, and so is watching more established programs mature. Dr. Michael Keidar's plasma thruster technology is a wonderful example of this.

For more than eight years, his team has been working to perfect a micropulsion system to propel miniature satellites and control them while in space. In May of 2015, they hit a milestone when the U.S. Air Force launched a rocket carrying a satellite and four plasma thrusters. As Dr. Keidar recalls, "It was the first mission of its kind to demonstrate whether the plasma thruster could work for a miniature satellite."

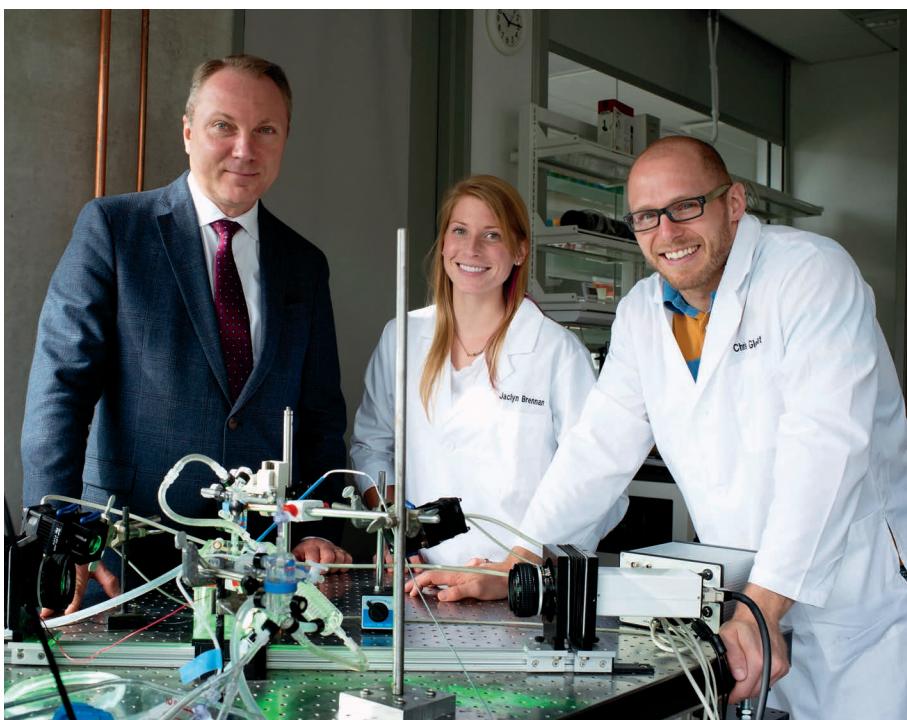
Eighteen months later, Dr. Keidar and two of his former researchers, Alexey Shashurin and Taisen Zhuang, were awarded a U.S. patent for the micro-cathode thruster. At about the same time, GW signed an agreement to license the plasma thruster technology created by Dr. Keidar's team to Vector, a company that connects space startups and innovators with reliable and affordable space access.

And shortly after that, NASA accepted a proposal from Dr. Keidar to launch GWSat, GW's Cube satellite, as part of NASA's CubeSat Launch Initiative. The initiative will provide launch opportunities from 2018 through 2020 for CubeSats as auxiliary payloads on planned NASA or commercial flight missions, or deployments from the International Space Station.

Micro-cathode arc thruster flight model



ELEANOR KAUFMAN KHAN



Dr. Igor Efimov conducts research on the abnormal heart rhythms that cause sudden cardiac death.

I'm confident we'll continue to hear more of Dr. Keidar's revolutionary plasma thruster technology as it is further developed and commercialized, and I'm excited to see the next stage of its development.

As I write, other technologies also are being "born" in the labs at SEAS, and other stories of their maturation await us. One of those stories likely will come from Dr. Igor Efimov's lab. Dr. Efimov, the chair of the Department of Biomedical Engineering, is the U.S. coordinator of a global study funded by the Leducq Foundation of France to research the abnormal heart rhythms that cause sudden cardiac death. Heart failure is a leading cause of death in the U.S., and although investigators have conducted countless studies of it, much of the research has been performed on animal hearts. Unfortunately, the results historically have been somewhat limited because researchers have not been able to translate their studies of animal hearts into successful medical treatments for humans.

Last May, the Leducq Foundation awarded a nearly \$6 million grant to six universities to learn who is most at risk for sudden cardiac death and to develop therapies to prevent it. After a kick-off meeting that Dr. Efimov

hosted late last year in GW's Science & Engineering Hall for researchers from the six universities, they began their work to develop screening and treatments for sudden cardiac death. In addition to GW, the other five universities participating in the study are Johns Hopkins University, Academic Medical Center in Amsterdam, Northwestern University, University of Auckland in New Zealand, and Université de Bordeaux in France.

In civil engineering, Dr. Majid Manzari received a four-year, \$1.3 million grant last summer from the National Science Foundation (NSF) to lead an international collaborative research project. The purpose of the project is to produce high-quality experimental data to establish the validity and range of applicability of existing computational models and simulation procedures for soil liquefaction analysis. Liquefaction is a pervasive problem during earthquakes that causes significant and costly damages to civil infrastructure.

GW is the lead institution under this grant. Its research partners include: the University of California at Davis; Rensselaer Polytechnic Institute; Cambridge University (UK); Kyoto University (Japan); National Central



ERIC GRAALLA

Dr. Erica Gralla studies agricultural supply chains in Uganda under a U.S. Agency for International Development grant.

University (Taiwan); Zhejiang University (China); The French Institute of Science and Technology for Transport, Development and Networks; Korea Advanced Institute of Science and Technology; the Korea Water Resources Corporation; and the Hong Kong University of Science and Technology.

In the Department of Electrical and Computer Engineering, Dr. Suresh Subramaniam is working on a network architectures project with a colleague at the Massachusetts Institute of Technology (MIT) and with partner organizations Microsoft and Infinera, a company that designs and manufactures optical components and systems.

Dr. Subramaniam is the lead principal investigator on this \$500,000 NSF grant to explore novel alternative architectures for data center networks that are based on several optical switching technologies.

Like Dr. Subramaniam, systems engineering professor Dr. Erica Gralla also is working with a colleague at MIT on a research grant. This project is funded by the U.S. Agency for International Development (USAID), and it aims to develop methods to evaluate the extent of systemic change in complex systems and to implement the methods to monitor the results of USAID's activities supporting various agricultural supply chains in Uganda. Dr. Gralla is the principal investigator on this \$560,000 sub-grant to GW.

Another notable achievement for one of our faculty members is the national honor conferred on Dr. Lance Hoffman when he was inducted into the National Cyber Security Hall of Fame last October. Dr. Hoffman, who leads GW's Cyber Security and Privacy Research Institute, was one of only seven



Dr. Lance Hoffman was named to the 2016 National Cyber Security Hall of Fame.

people inducted into the Hall of Fame's Class of 2016. The selection committee cited his achievement in developing the nation's first regularly offered university course on computer security, as well as his research on cryptography policy, risk analysis, and statistical inference for data mining.

This collection of notes on some of our research projects gives a good sense of the level of research activity here at SEAS, but it paints an incomplete picture of the contributions our faculty make to the school. These same faculty members also help our students in myriad ways: teaching them, advising and mentoring them, getting them involved in research projects, helping them find internships, and developing new academic programs for them.

Total undergraduate enrollment has increased almost 70 percent in just eight years, and this year's enrollment is our highest ever.

All of these efforts help create the SEAS synergy and build our flourishing SEAS community. That's nowhere more obvious than among our undergraduate students. To begin, our classes are continuing to grow, and by significant numbers.

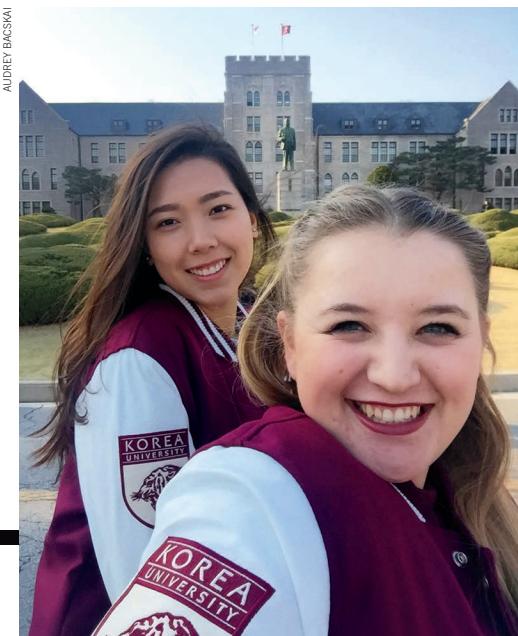
The total undergraduate student population is 953 this year, our highest ever. For comparison's sake, our total undergraduate student population in 2009 was 582. That's almost a 70 percent increase in just eight years. And for five consecutive years, our freshman class size has exceeded 200 students.

Our study abroad programs also are growing. The SEAS faculty believe in these programs and emphasize the importance of them to our students. We also "put our money where our mouth is" and help fund travel expenses for our students where we can. And it's making a difference. Last year, the programs attracted 62 SEAS students. The next highest level of participation was 39 students a few years back.

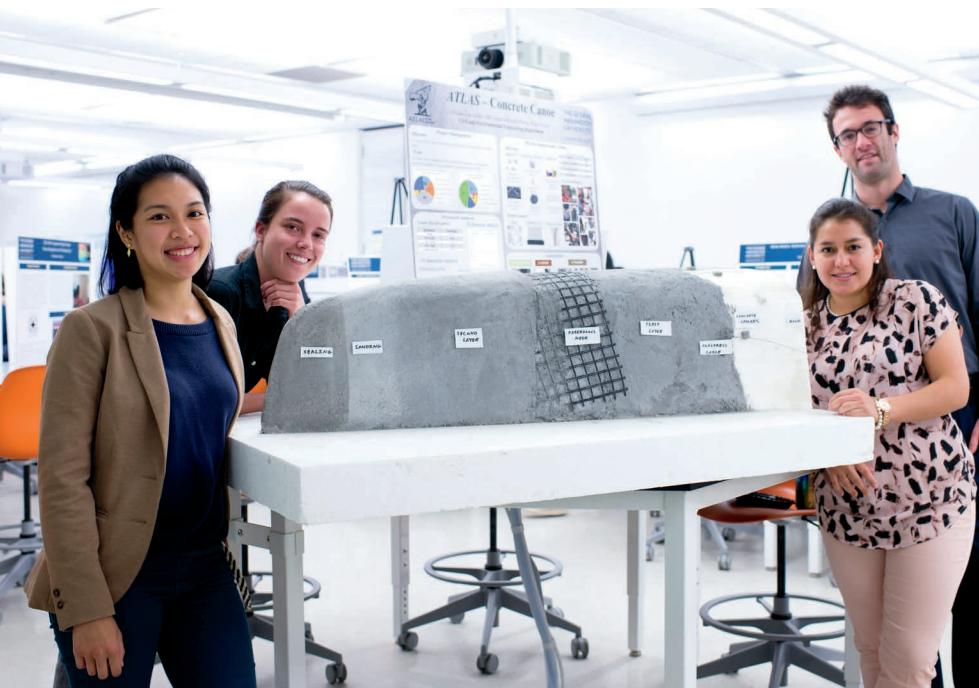
At the graduate level, we have growing, thriving masters and doctoral programs, including three new programs. Two of the programs—the Master of Engineering degree in cyber security policy and compliance, and the Doctor of Engineering degree in engineering management—are new online programs for working professionals.

As we developed all three new programs, we made an effort to listen to the needs of working engineers. The Doctor of Engineering program includes a praxis (a significant project that is applications-oriented) instead of a dissertation, so each student can work on a problem facing the company for which he or she works. Our Master of Science degree in electrical engineering with an emphasis on power systems is a new program we developed for a cohort of engineers working on the design of electric ships for the Navy at the Huntington Ingalls shipyard.

An increasing number of SEAS students are studying abroad.



AUDREY BACSKAI



SEAS seniors have participated in the Pelton Senior Design Competition every year since 2009, when Joseph Pelton endowed the competition.

We listened, and students seem to be responding. By August of this year, we will have 170 students in the Doctor of Engineering program and 135 in the Master of Engineering program. The first cohort of students finished the Master of Science program at Huntington Ingalls shipyard, and 20 new students already have started a second cohort of the program.

New programs, new students, terrific faculty. We have so many bases on which to build. But the picture isn't complete until we add in another key "element" of our synergy, our philanthropic partners. They can make the difference between a good idea that sits on the shelf for lack of funds to implement it, and a new program, scholarship, or other opportunity that opens doors for our students or faculty.

Philanthropic giving has been increasing for more than six years, and this year we broke another record.

We've had a steady upward trend in philanthropic giving for more than six years, but this year we broke another record, thanks in large part to an \$8 million gift from the Clark Charitable Foundation.

In 2011, the late A. James Clark, founder of Clark Enterprises and GW trustee emeritus,

established our Clark Engineering Scholars Program with a gift of \$8 million. This year, the Clark Charitable Foundation decided to double the program's endowment—with an additional \$8 million—so SEAS can increase both the scholarship amount and the number of deserving students who will receive scholarships each year.

Alumnae, like Renee Lewis (left) and Sana Al-Hajj (right), can play a tremendous role in mentoring SEAS students.



ELEANOR KAUFMAN KHAN
The Clark Engineering Scholars Program is truly "a gift that keeps on giving" to our students, creating opportunity after opportunity for them. It is a prime example of what I meant when I wrote that philanthropy can mean the difference between good but unrealized ideas and opening new doors for students. I encourage you to read more about the program and the gift on page 14.

On the faculty side, our dream of creating more endowed professorships was realized when SEAS alumnus Patrick Martin (D.Sc. '72) and his wife, Donna, endowed the Patrick and Donna Martin Professorship. With this newly created professorship, we were able to recruit Dr. Robert Pless to lead our computer science department. You can read more about this gift and Dr. Martin on page 20.

In this annual article, I can provide some of the highlights and an outline, of sorts, of our ongoing successes, but there is so much more that a visit to SEAS and the Science and Engineering Hall can provide. Here, you can meet many of the people behind our synergy and fill in the details of the picture yourself. I encourage you to pay us a visit and see for yourself all that is happening at SEAS.

Afterwards, you might find yourself wanting to brag a little to friends or colleagues about what you heard and what you saw. It's okay to do that. Remember, "it ain't braggin' if it's true."

Connor Roberts

A Young Innovator **STARTING OUT**

Engineering seems to run in the blood in Connor Roberts' family. His father is an electrical engineer and his mother a mechanical engineer. When Connor enrolled at SEAS as a freshman he chose to study biomedical engineering. He says, laughing, "As a biomed major, I was on nice neutral ground."

At the end of his sophomore year, however, he decided to switch to electrical engineering, upsetting that family balance but sparking a series of very successful projects and innovations.

One of these was his senior design project. Adapted from a pre-engineering project he did in high school, Connor presented the idea to his senior design class, and two of his classmates decided to join him, working together to build a solar thermal electric generator. Their idea, which ultimately won last year's Best Electrical Engineering Senior Design Project prize, was to build a reflective trough that would concentrate sunlight to generate heat and then convert the heat into electricity.

"We were adapting this method that already exists for giant power plants in the desert," he says, "and we were trying to make a smaller version you could use in your home as a substitute for solar panels. It's a different way of harvesting solar energy."

An interest in energy projects has been a constant throughout Connor's college career. In fact, he served as president of the Association of Energy Engineers as an undergraduate. Another constant is his interest in economics and entrepreneurship, which may actually have started with the chicken business he ran as a high school student, selling the eggs from his 30 chickens to his neighbors.

All of these interests seem to have converged this year in his graduate studies. After finishing his bachelor's degree with a double major in electrical engineering and economics in spring 2016, Connor decided to stay an extra year to complete a master's degree in engineering management



with a concentration in economics, finance, and cost engineering.

"Engineering management represented the perfect marriage between electrical engineering and economics," he remarks. "I can use my economics toolbox and apply that to engineering problems."

And that is exactly what he has been doing, working under the guidance of SEAS Professor Ekundayo Shittu. Using his electrical engineering background, Connor worked with Dr. Shittu to design an asset monitoring device to be used in health care facilities. The device monitors the environmental exposure and usage of equipment to try to predict when it will need maintenance. The purpose of the device is two-fold: to minimize the likelihood that a particular piece of equipment will malfunction when being used on a patient, and to reduce preventive maintenance.

Connor credits Dr. Shittu with giving him the chance to work on the project and to help present it to their sponsor, LMI. "Dr. Shittu carved out one-third of our

last presentation to LMI for me to give. Most principal investigators on a grant wouldn't do that. That was a great experience for me," he notes.

Connor has successfully pitched the device in other settings, too, most recently at last fall's GW Pitch George Competition and this year's SEAS Student Research and Development Showcase. He won 2nd Place in the graduate track at the Pitch George Competition and won the Agile Trailblazers Innovation Award at the R&D Showcase.

As he prepares to graduate, Connor ultimately has restored the engineering balance within his family. His mother, it turns out, received her master's degree in engineering management from GW's Off-Campus Programs several years ago, so the family soon will have two graduates each of electrical engineering and engineering management programs.

Rudy Rodriguez

An Accomplished Innovator, **STILL GOING STRONG**



Rodolfo "Rudy" Rodriguez graduated from the University of Miami in 1963 with a bachelor's degree in electrical engineering, and just a few years later he found himself doing biomedical research after being drafted into a special Armed Forces program for engineers and scientists.

When he left the service two years later, he still had doubts about the then-nascent biomedical engineering field and thought he might rather be a doctor. On a visit to GW's medical school, he happened to run into Dr. Marvin Eisenberg, a young engineering professor who was setting up a new program in medical engineering. Rudy questioned him and got an answer that has stayed with him throughout his entire career.

"He said, 'No, you are in the perfect field. Most of the advances in medicine are going to be in engineering. You will be able to help thousands of people at one time, not two or three at a time as a doctor does.' He said, 'Come to GW and we will give you

the tools,'" Rudy recalls. "And, of course, he was absolutely right. That guy changed my life. If I hadn't run into him I would have gone into medical school."

Rudy completed a master's degree with a biomedical engineering emphasis at GW in 1969, and as it turns out, he has been able to help *millions* of people, not thousands. Over the course of his career at Baxter International, Beckman Coulter, and Becton Dickinson, Rudy co-invented or managed the development of several products that have changed the way health care is practiced in the U.S.

One of those products was the Fenwal CS3000™ Cell Separator, which draws blood directly from donors, separates the platelets from whole blood, and returns the remaining blood components to the donor. Rudy was a co-inventor of it with Dr. Herb Cullis. He recalls that the idea was considered risky at the time and was difficult to get approved. In the end, the product was on the market for 30 years, and Rudy calculates that 200 million people were transfused through it.

Other innovative hematology products—including the QBCTM Centrifugal Hematology System for human blood analysis, and a re-engineered version of it for cats, dogs, and horses—were also quite successful. In fact, Rudy was so successful at developing new technologies that he was presented the R&D 100 Award four times for one of the "100 Most-Significant New Technical Products of the Year." More impressively even, he was elected in 2016 to the National Academy of Engineering "For inventions to analyze blood and separate blood components that enable widespread clinical therapies."

Rudy retired in 2001 and formed his own company, Advanced Animal Diagnostics. He had seen what diagnostic equipment could do for veterinary practice and he knew that it could make critical advances in livestock production and animal care. He started by developing the QScout™ Farm Lab, a rapid diagnostics technology to detect mastitis, an infection of the milk producing gland in cows that costs the milk producer industry \$2-3 billion per year. The technology is now being used in dairy farms across the U.S. to detect mastitis at a very early stage so it can be isolated and treated quickly.

Rudy is especially interested in curtailing the use of on-farm antibiotics, and he foresees a potentially dire situation for humanity if we do not. Since farmers normally don't know which animals are sick, they commonly give antibiotics to all the animals as a preventive measure. However, bacteria quickly become resistant to antibiotics, and with a large percentage of antibiotics being used preventively, rather than selectively, on farm animals, this is quickly speeding up the creation of resistant bacteria, leaving both humans and animals at grave risk in the future of having few effective antibiotics available to treat even common infections.

Rudy believes on-farm diagnostics will reduce the use of antibiotics in farming by allowing farmers to test animals for diseases and then give antibiotics only to sick animals. "We want to make a difference in animal health," he concludes. It seems he is on his way to doing that.

News



ELEANOR KAUFMAN KHAN

Clark Engineering Scholars Program Receives Gift of \$8 million

Something great at SEAS just got even better. With a recent \$8 million gift from the Clark Charitable Foundation, SEAS will be able to expand its highly successful Clark Engineering Scholars Program and offer its many opportunities to more SEAS undergraduate students.

The scholars program was established in 2011 with an initial \$8 million contribution from the late A. James Clark, founder of Clark Enterprises and GW trustee emeritus. The gift gave SEAS the resources necessary to build a first-rate engineering leadership program. Recognizing the college debt burdens that many recent graduates face, the Clark Charitable Foundation decided to double the program's endowment so SEAS can increase both the scholarship amount and the number of deserving students who will receive scholarships each year.

Responding to the gift, SEAS Dean David Dolling said, "We're extremely grateful to the Clark Charitable Foundation for expanding the program that Mr. Clark established to develop engineering leaders. The program's exceptional leadership training and experiences help us attract outstanding young men and women to SEAS, and the foundation's generous

expansion of it means that SEAS will be able to attract even more of these students."

Through the program, the scholars participate in a range of experiences designed to develop and hone engineering and leadership skills. These include an annual leadership "boot camp" led by successful SEAS alumni, summer internships or research experiences, a semester abroad, one-on-one mentorship by SEAS alumni, the chance to attend relevant student conferences, and community service. The new gift from the foundation also expands the scholars' opportunities to acquire business and management skills and participate in mentorships.

SEAS already boasts 16 Clark Scholars alumni and 29 current scholars. Competition to get into the program is stiff, but for the scholars the program is well worth the effort. One of the highlights is the study abroad component. The scholars have travelled far and wide, sometimes creating their own opportunities at universities with which SEAS has not traditionally had study abroad relationships. Their study abroad locations have included: Australia (Melbourne University), Hong Kong (Hong Kong University), Ireland (University College Dublin), Japan (Sophia University), Korea (Korea University), South Africa (University of Cape Town), Spain (University of Barcelona), and Turkey (Bogazici University).

Junior Colby Bott reflected on his study abroad experience, saying, "I fulfilled the [Clark Scholars study abroad] requirement last spring by going to study in Ireland at the University College Dublin. However, the experience didn't feel like a requirement; it felt like an incredible adventure . . . The Clark Scholars program creates so many more opportunities to explore not only your academic interests, but the work. I'm able to study civil engineering on the other side of an ocean and explore its career options on a global scale."

Other scholars appreciate the camaraderie of the program and the example that the scholars set for each other. Senior Abbie Gillen said, "This opportunity has connected me to a great group of fellow scholars with whom to share the experience. They are all an inspiration because of the great things they accomplish."

And they are an accomplished group. While the Clark Scholars alumni are still recent graduates, they are already distinguishing themselves. Some, such as Andrea Lehn, are studying in top engineering graduate programs. Andrea graduated in 2015 and is now pursuing her doctoral degree in mechanical engineering at MIT. Others are working in leading engineering and technology firms, such as Microsoft, Northrup Grumman, or Clark Construction, or in government positions. Liam Cusack graduated in 2014 and now works at the Johns Hopkins Applied Physics Laboratory.

Current scholars also are getting experience in top corporate and government offices, aided by the program's summer research and internship requirement. Last year, scholars completed engineering-related summer internships at Google, Lockheed Martin, the National Institutes of Health, PriceWaterhouseCoopers, and other organizations.

The recent gift from the Clark Charitable Foundation will enable SEAS to make these sorts of opportunities available to more students by increasing the total number of current scholars from 29 to 40. Yet, while the scholars speak gratefully about the many leadership training experiences the program provides them, the importance of the scholarship itself is not lost on them. For some, it means the difference between studying at SEAS or not.

Junior Kate McNally summed it up, simply stating, "The Clark Scholars program is the main reason I was able to attend GW."

The Fruits of Hard Work and Curiosity

Undergraduate and graduate students displayed 116 posters in the Science and Engineering Hall in February as they vied for \$50,000 in prizes during the annual SEAS Student Research and Development Showcase.

This year's showcase also included an Entrepreneurship Prize Competition, the poster and prototype presentation phase of the new SEAS Innovation Challenge, and a special display of research that SEAS undergraduate students conducted last summer in Korea as part of the GW-Korea University Exchange Program.

Manny Rivera (MS '05), founder and owner of RiVidium Inc., the Platinum Sponsor of the showcase and a Virginia-based company focused on software and cyber security, delivered the day's keynote address. After thanking the faculty for guiding the students, he congratulated the students on their accomplishments and advised them not to give up their creative and entrepreneurial spirits. "There are three vital things that can take any entrepreneur anywhere they want to go: curiosity, internal drive, and learning from the people we meet," he stated.

Following the keynote address, the showcase prizes were awarded across four categories: graduate theoretical research, graduate experimental research, undergraduate research, and entrepreneurship.

Nima Mobadersany, a mechanical and aerospace engineering graduate student, won the top prize of \$5,000 in the theoretical poster category for his project, titled "Perforation of cell membranes using contrast agent microbubbles in the presence of ultrasound." He was mentored by Dr. Kausik Sarkar.

Elizabeth Manning, a civil and environmental engineering graduate student, was awarded \$5,000 in the experimental poster category for her project, titled "The role of viscosity in mesophilic anaerobic digestion." She was mentored by Dr. Rumana Riffat.

Joseph Marbach, a biomedical engineering student, took home the \$2,000 Best Undergraduate Poster Award for his project, titled "Oxytocin benefits patients with obstructive sleep apnea." His mentor was Dr. Matthew Kay.

The \$2,000 AgileTrailblazers Innovation Award, geared at innovative projects with potential commercial value, was awarded to Connor Roberts, an engineering management graduate student, for his project, titled "Internet of Things device for a safer, more efficient medical asset management system." The award was provided by SEAS alumnus and National Advisory Council member Naeem Hussein (MS '99).

SEAS thanks the Platinum Sponsor of the showcase, RiVidium, Inc., as well as our other generous sponsors: Leidos; Siemens; Hegarty Research, LLC; Cisco; GW's Office of Innovation and Entrepreneurship; AgileTrailblazers; Capital Construction Consultants; and the developer of the showcase app, Mr. Larry Lu.

EDITOR'S NOTE: This article is an edited version of the *GW Today* article "Student Innovations Highlighted at SEAS R&D Showcase."

Innovation Gets a Boost at SEAS

Discovery and innovation are at the heart of engineering, so they also should be key components of an engineering education. At SEAS, Dean David Dolling has been working with the faculty to build a culture

Annamaria Konya Tannon



of innovation, and he accelerated that effort in late 2016 by hiring Ms. Annamaria Konya Tannon as the school's chief evangelist for innovation and entrepreneurship. She is a technology entrepreneur and angel investor who has been involved in technology enterprise creation for more than 15 years, primarily in Silicon Valley.

In this role, Ms. Konya Tannon works to help spur and lead innovation and entrepreneurship at SEAS and with the broader GW community. "To advance innovation and entrepreneurship at SEAS, we're now introducing the entrepreneurial mindset early on in the curriculum for undergraduate and graduate students," she explained. "In keeping with our mission, we've recently created an innovation center in Tompkins Hall that will support and further develop ideas that faculty and students generate in their research and studies."

Ms. Konya Tannon is working on several other initiatives, as well. For example, in the innovation center, students and faculty find opportunities to collaborate with the local community to solve real-life problems. This summer, the center also will offer a course—open to all SEAS students—to learn and apply design thinking methodology and to gain insight into how to launch a startup.

With plans to expand innovation activities and reach out to students and faculty at other GW schools, Ms. Konya Tannon welcomes SEAS alumni to share their entrepreneurial talents and experiences with the faculty and students. "Alumni involvement will be crucial for our success," she said, "and they can be involved in several different ways—mentoring and advising, working with students, or speaking at events."

SEAS Student Research and Development Showcase winners



ELEANOR KAUFMAN KHAN



ELEANOR KAUFMAN KHAN

Dr. Robert Pless

At the Helm of the CS Department

SEAS welcomes Robert Pless, the new chair of our Department of Computer Science and the Patrick and Donna Martin Professor of Computer Science. He is the first faculty member to hold the newly endowed professorship.

Dr. Pless joined GW in January after 16 years on the faculty of Washington University in St. Louis. At Washington University, he founded and directed the Media and Machines Laboratory as a focal point for teaching and conducting research on machine learning, robotics, human-computer interaction, graphics, and vision. His research particularly focuses on developing computer vision algorithms for geometric inference with applications to biomedical imaging, remote sensing, robotics, and social justice. (*See article on page 4 to learn more about Dr. Pless' research.*)

With more than 125 peer-reviewed conference and journal articles to his name, Dr. Pless has published extensively, and he has received funding for his research from a wide range of government agencies, research labs, and corporations.

Now, as chair of the computer science department at SEAS, he is eager to help build the department's research programs. "This is such an exciting time to be computer science faculty," said Dr. Pless. "The faculty here work on some of the most interesting problems for society today: privacy, security, the internet of things, computing in the cloud, and machine

learning. They are really at the forefront of research on those topics."

Dr. Pless has been observing his new department since he arrived, and he sees its strength in the dedication and energy of the faculty and in their research programs. He also says that he has been "incredibly impressed" by the undergraduate students and the supportive culture they are building for studying computer science.

Noting the profound impact of computing on daily life, he wants to capitalize on the department's strengths and the university's location to build connections across the university and throughout the Washington, D.C., area.

"Right now we have an outstanding classical computer science department. The biggest promise in increasing the impact of our department—especially in a school like GW that has so many other strengths in political science, law, and business—is to understand how computer science will change those fields in the next 10 years," he explained.

Dr. Pless is already at work spreading the word and is eager to share it with alumni, too. Asked what he wants SEAS alumni to know about the department's direction, he replied, "As we grow and modernize our research and teaching efforts, I enthusiastically encourage you to stay in touch, share your experiences, and build relationships with our current students and faculty!"

New Faculty



Dr. Russell Hemley

Russell Hemley is a research professor in the Department of Civil and Environmental Engineering. He recently joined SEAS after three decades at the Geophysical Laboratory of the Carnegie Institution of Washington. His research explores the nature of materials in extreme environments, specifically high pressures and temperatures. The work includes high-pressure experimental and theoretical studies in chemistry and physics, earth and planetary science, soft matter and biology, and the creation of new materials for technology using extreme conditions.

Dr. Hemley is the director of the Capital/Department of Energy Alliance Center, the director of the Department of Energy's Energy Frontier Research in Extreme Environments, co-executive director of the A. P. Sloan Foundation-funded Deep Carbon Observatory, and chair of the JASON Advisory Group. He is a Fellow of the American Academy of Arts and Sciences, Member of the National Academy of Sciences, Corresponding Fellow of the Royal Society of Edinburgh, and Honoris Causa Professor of the Russian Academy of Sciences.



Dr. Arzhang Angoshtari

Arzhang Angoshtari joined SEAS in 2016 as an assistant professor in the Department of Civil and Environmental Engineering. He previously was a postdoctoral scholar in the Division of Engineering and Applied Science at the California Institute of Technology. He obtained his Ph.D. from the Georgia Institute of Technology. His research interests include theoretical and computational mechanics, mechanics of shells and membranes, non-linear elasticity, dynamical systems and chaos, and lattice theories of solids. He received the Georgia Tech Jean-Lou Chameau Research Excellence Award and the Iranian Society of Mechanical Engineers Award in Applied Mechanics for his MS thesis.



Dr. Michael Myers and Mrs. Sheila Myers

ELEANOR KAUFMAN KHAN

Scholarship Established to Honor Dr. Michael Myers

Mrs. Sheila Myers has made a generous pledge to support scholarships in honor of her husband, Dr. Michael Myers, a GW Professor Emeritus of Engineering and Applied Science, who passed away last October. Her gift to establish the Michael K. Myers Engineering Scholarship will provide merit-based, annual scholarships totaling \$40,000 for undergraduate and graduate students in the Department of Mechanical and Aerospace Engineering (MAE).

"Michael's family did not have the resources to help him with college costs and so he went to both Willamette and Columbia based on his scholarship, hard work, and discipline," wrote Mrs. Myers. "He went to college, graduate and undergraduate, by placing first in all areas of endeavor. Thus, the idea of helping others who deal with the same limited resources seemed the ideal way to honor my beloved husband."

Dr. Myers joined GW in 1973 as an associate professor and helped to establish the Joint Institute for Advancement of Flight Sciences at NASA Langley Research Center. Over the next 35 years, he played a critical role in building the program's international reputation, establishing curricula and teaching, and obtaining funding for research opportunities for graduate students. He was promoted to professor in 1978 and became the technical director of the aeroacoustics program. In 1999, he was elected chair of the MAE

department, a position he held until he retired in 2008.

The research he conducted over the course of his career resulted in a number of noted fundamental contributions to theoretical and computational aeroacoustics, and he directed the theses and dissertations of nearly 50 graduate students. His seminal work came in 1980, when he published "On the Acoustic Boundary Condition in the Presence of Flow" in the *Journal of Sound and Vibration*. The Myers Boundary Condition, as it came to be known, is now well-established in acoustics.

Dr. Myers was active in the American Institute for Aeronautics and Astronautics (AIAA) and the Acoustical Society of America; he was an Associate Fellow of AIAA and an associate editor of the *AIAA Journal*; and he was a member of several engineering honor societies: Sigma Xi, Tau Beta Pi, Omicron Delta Kappa, Phi Eta Sigma, and Pi Tau Sigma.

"Professor Mike Myers was an outstanding researcher, scholar, and teacher," said Dr. Michael Plesniak, the current chair of the department. "His courses were known for their academic rigor and high standards, and his dedication to students and education was remarkable. After serving for 10 years as MAE department chair, he was a terrific mentor to me during my first year as chair, and I am grateful for the wisdom and insight that he shared with me. The generous scholarship from the Myers family is a very

wonderful way to honor Mike's memory and to continue to enable students' education in MAE."

Mrs. Myers hopes to do just that. "At Michael's memorial service many students said they felt his mentorship had been vital to their education and careers," she noted. "I suspect there are many other former students throughout the country who feel the same way. This scholarship is one more way that his influence can help other students now and in the future to achieve their goal."

SEAS Faculty Award Winners

SEAS congratulates our four recipients of the 2016 Faculty Research and Teaching Awards:

SEAS Distinguished Researcher:

Dr. Xiuzhen "Susan" Cheng
(Department of Computer Science)

SEAS Distinguished Teacher:

Dr. Shahrokh Ahmadi (Department of Electrical and Computer Engineering)

SEAS Outstanding Junior Researcher:

Dr. Volker Sorger (Department of Electrical and Computer Engineering)

SEAS Outstanding Junior Teacher:

Dr. Megan Leftwich (Department of Mechanical and Aerospace Engineering)



Dr. Cheng



Dr. Ahmadi



Dr. Sorger



Dr. Leftwich

ELEANOR KAUFMAN KHAN

Achievement



Audrey Bacskai

An Ambassador for Study Abroad

Audrey Bacskai traveled cross country to attend school at GW, but she also wanted to travel much farther than that during college. She wanted to spend a semester overseas, so having a study abroad option was an important factor in her decision to study at GW.

"I decided to come to GW because of SEAS and study abroad," Audrey recalls. "GW made it so easy to go abroad. At other schools I would have had to do it in the summer or stay an extra semester. At GW they're basically pushing you out the door to go study abroad."

Eager to start her new adventure, Audrey attended SEAS study abroad information sessions her freshman year so she could learn more about the options available to her. She decided to study at Korea University during the spring semester of her sophomore year.

"I chose Korea because it was the most different of the options," says Audrey. "I had never really considered going to East Asia, but SEAS figured everything

out for me, including the housing and the classes. I won't have the chance again in life to so easily go to a place where I know nothing about the culture or the language."

Nine other SEAS students joined Audrey that semester studying at Korea University (KU) under the GW-KU Partnership Program. Although the program is a special arrangement between the two universities, Audrey had plenty of contact with students from around the world, in addition to her Korean classmates. In fact, she roomed with exchange students from Sweden, Australia, and . . . Louisiana.

Living abroad isn't without its challenges—Audrey recalls being a little homesick at times and missing salads—but she enjoyed the program so much that she elected to stay at KU through the summer and participate in the GW-KU summer research program. There, she worked in a biomechanical lab, where she helped manufacture silicon chips and do cell cultures.

Returning to the Foggy Bottom campus last fall for her junior year, Audrey picked up on her mechanical engineering classes and her activities. She has been active at SEAS in the Engineers' Council; the SEAS student peer mentor program; and Alpha Omega Epsilon (AOE), the women's professional engineering sorority.

"At SEAS, we have a high percentage of women in engineering," Audrey notes. "It's fun to walk into a class and always know at least five people, because they're in AOE with me. We also have panels of alumni speakers who provide us tips and advice about the professional world."

Audrey happily talks of her activities here, but her face still lights up as she speaks about her time overseas. She even offers advice to underclassmen considering it.

"I think everyone should do study abroad, especially here, where it's so easy. It's a great opportunity. It's humbling and it's exciting," she enthuses. "Just send in the paperwork and do it!"

A Systematic Thinker

Kiersten Washle always liked school but found herself wanting to be more challenged academically, so when a brochure from Salem Academy in

Winston Salem, NC, arrived in her mailbox, she jumped at the chance to attend high school there as a boarding student. She and her parents made an agreement that she would be allowed to attend Salem Academy if she received a full-ride scholarship. She did, and off she went to a small school with a large international student population.

When the time arrived to apply for colleges, several of the same factors that drew Kiersten to her high school drew her to SEAS—a small school with a big international student population and "a unique opportunity that looked like a chance to better myself," she reports.

Now a graduating senior majoring in systems engineering, Kiersten started at SEAS as a civil engineering major.

"I always wanted to create sustainable infrastructure, but I realized that I wanted to think more about how things interconnect, rather than just the materials that structures are made of," she explains. "Everything has to look at itself as a system. Instead of having waste, we have outputs of one thing that are an input to something else."

Kiersten is passionate about green infrastructure and wants to change the way that people interact with the environment. She's thrilled, therefore, that the systems engineering program creates a path that can lead to city

Kiersten Washle





Jordan Williams

Doing What He Loves

Jordan Williams has been playing piano since he was seven and performing since he was 11. He is a jazz musician who didn't want to have to abandon his music when he started college, but didn't want to major in it either. He wanted to study engineering instead. At GW, he found his opportunity to be both an engineer and a musician.

"I received a GW Presidential Scholarship in the Arts, which gave me the opportunity to minor in music, instead of majoring in it, so I could major in what I wanted," Jordan explains. "That's one of the things that definitely attracted me to GW."

Jordan decided to study biomedical engineering because he thought it would give him "the most direct way to help people." Wanting to pursue his major beyond the classroom, he took a volunteer summer internship at the Veterans' Administration (VA) Medical Center in Philadelphia after his sophomore year. At the VA Center, he assisted biotechnicians in the lab and learned how to troubleshoot and calibrate some of the lab's equipment.

The summer after his junior year, he participated in the SEAS Summer Undergraduate Program in Engineering Research, helping with research in Dr. Michael Plesniak's Bio-fluid Dynamics Lab. He helped run simulation experiments in the lab and developed a research abstract that subsequently was accepted into the annual SEAS Student Research and Development Showcase.

As he reflects on his various activities at GW, Jordan muses, "I think I've learned so much from every opportunity I've had at GW. I learned a lot from my classes, and I'm especially grateful for the chance to work in a lab."

Jordan also has been involved in outside activities such as National Society of Black Engineers initiatives and, most especially, a variety of music programs and performances. During college he has continued to perform professionally—and in some very impressive venues. He has given various concerts in GW's music department and was invited to open for Ravi Coltrane (son of John Coltrane, a world-renowned jazz saxophone player) at GW's Lisner Auditorium.

planning or urban infrastructure, where she eventually can put her knowledge to work.

In the meantime, she has been developing her knowledge in various ways, including through the Nanotechnologies Fellows Program, headed by SEAS Professors Saniya LeBlanc and Ekundayo Shittu. The program introduced her to nanotechnologies and gave her the opportunity to work on research. She participated in the program during the summer after her junior year and then extended her research for the remainder of the summer under the guidance of Dr. LeBlanc.

Kiersten says that she enjoyed her research experience and appreciates what she learned from it, but she doesn't think a career in research is for her. She is more interested in implementing new technologies and one day, hopefully, seeing them change urban landscapes.

Her next step toward that goal will be to remain at SEAS next year to complete a master's degree in engineering management with a focus on environmental and energy management.

Last year, he was one of 24 young musicians invited to participate in a two-week international jazz residency at the Kennedy Center. The program included master classes taught by some of the world's top jazz musicians, and the chance to have some of his original compositions critiqued by them. At the end of the program, Jordan and the other young musicians gave performances at both the Kennedy Center and the Apollo Theater. The chance to learn from some of the artists he grew up listening to was a dream come true for him.

As Jordan prepares to graduate, he remains committed to his music, planning to be an engineer by day and a jazz pianist by night.

"I'm continuing to practice and be the best musician I can be," he says. "Fortunately, you can be very well known as a jazz musician and still pursue your dream of helping others through biomedical engineering."

News

Pat and Donna Martin Establish Endowed Professorship

SEAS alumnus Patrick Martin and his wife, Donna, have established a new professorship at SEAS through a combined donation and bequest.

Robert Pless, the chair of the Department of Computer Science, holds the newly endowed Patrick and Donna Martin Professorship. Dr. Pless joined GW in January after 16 years on the faculty of Washington University in St. Louis. (*See article on page 16 to learn more about Dr. Pless.*)

The gift from Dr. Martin and his wife reflects his long-standing relationship with GW, which goes back to 1966, when he earned his master's degree in mathematics from the Columbian College of Arts and Sciences. In 1972, he completed his doctoral degree in computer science at SEAS and has since been a long-time supporter of the school and of engineering education in general. He is a former member of both the SEAS National Advisory Council and the GW Board of Trustees. He was honored with GW's Distinguished Alumni Achievement Award in 1997, and was inducted into the GW Engineering Hall of Fame in 2006.

"Our gift is both a recognition of all that SEAS and GW have accomplished and an enabler to help the school grow in quality and reputation," Dr. Martin said. "In our case, we focused on computer science, in part because that was my field of research, but primarily because the school identified computer science both as a need and an opportunity."

Dean David Dolling thanked Dr. and Mrs. Martin for their gift and noted the important role of partners in building the school and its reputation. "Speaking on behalf of the school and particularly our computer science department, I thank Pat and Donna Martin for their very generous gift and their partnership with SEAS," he said. "Pat has a genuine commitment to SEAS, and he understands how important it is to have the resources to build, especially in areas that represent strategic growth opportunities for us. He and Donna responded graciously to our request, and we're grateful to them.

Gifts like theirs make it possible for us to compete with top schools and successfully recruit faculty of Robert Pless' caliber. Appointments like this help us build the school and its reputation."

Supporting the SEAS Transformation

SEAS thanks our alumni and friends whose generous gifts support new funds or programs that help to further the SEAS transformation. The following list includes those gifts received between July 1, 2015 and March 31, 2017.

W. Scott Amey (MS '75) and his wife, Deborah, made an additional gift to support the Knowledge in Action Career Intern Fund (KACIF) at SEAS. KACIF is a highly competitive program that provides grants of up to \$3,000 to GW undergraduate and graduate students pursuing internships that are necessarily unpaid. The Amneys also made a gift to support the Steven and Diane Knapp Endowed Scholarship Fund.

Ibrahim Ashie (BS '70, MS '73) made an additional gift to support the Ibrahim Ashie Engineering Scholarship Fund.

Clark Charitable Foundation, Inc. augmented the endowed Clark Engineering Scholars Program with an additional gift. The program provides financial assistance, professional development, and leadership and networking opportunities for SEAS students who are selected as Clark Engineering Scholars.

Terry Collins (D.Sc. '76) made a gift to support the Steven and Diane Knapp Endowed Scholarship Fund.

Comcast Corporation awarded a gift to support research on cloud data centers.

Edwin Henry Copenhaver, III (MS '75), who passed away last June, established a Charitable Remainder Trust that will provide support to the Department of Engineering Management and Systems Engineering.

Mark Hughes (CCAS BS '69, SEAS MS '77) made a gift to support the SEAS Dean's Excellence Fund.

Anirudh Kulkarni (BS '86, MS '88) and his wife, Priya, through his company CVP (Customer Value Partners), created an endowed speaker series focused on innovation,

entrepreneurship, and the impact of technology on change.

Leidos made a gift to support the SEAS Industry Partners Program and sponsored the New Student Getaway, Society of Women Engineers, National Society of Black Engineers, SEAS Student Research and Development Showcase, Order of the Engineer Ceremony, and collaborative research in the area of data analytics. Chief Technology Officer **Gulu Gambhir (MS '92, D.Sc. '98)** initiated the support from Leidos.

Chris Milam provided a gift to support research on low energy nuclear reactions.

Frank Moy (BS '65) and his wife, Marcia, continued their support of the Frank Moy and Marcia Mau Annual Scholarship for students with financial need in mechanical and aerospace engineering. Separately, Mr. Moy pledged a gift to create a new scholarship in his name for students in mechanical or aerospace engineering.

Michael and Sheila Myers provided a combined bequest and a current use gift from Mrs. Myers. Mrs. Myers made the gift in honor of her late husband, Professor Emeritus Michael Myers, who passed away last fall. Before his retirement, Dr. Myers was a faculty member and chair of the Department of Mechanical and Aerospace Engineering (MAE). The funds will support merit-based scholarships and stipends for both undergraduate and graduate students in the MAE department. (*See article on page 17 to learn more about Dr. and Mrs. Myers' gift.*)

Raytheon made a gift to support the SEAS Industry Partners Program and sponsored faculty innovation and collaborative research in the area of data analytics.

Manny Rivera (MS '05) made a gift to support the SEAS Student Research and Development Showcase as the Platinum Sponsor on behalf of his company, RiVidium.

Siemens Corporation made a gift to support the SEAS Industry Partners Program and sponsored the GW Engineering Hall of Fame Dinner and Awards Ceremony and the SEAS Student Research and Development Showcase.

Howard Tischler (MS '80) continued his support of the Green Tischler Endowed Scholarship Fund.

Charles Watt (MS '73, D.Sc. '86) and his wife, Linda, made an additional gift to support the Science and Engineering Hall at SEAS.

Yaqin Zhang (D.Sc. '90) and his wife, Jenny Wang, pledged to create The Zhang and Wang Endowed Scholarship Fund in honor of Professor Emeritus Raymond Pickholtz, who taught electrical engineering at SEAS. The fund will provide scholarships for an undergraduate or graduate student studying at SEAS.

Hall of Fame

Family, friends, and colleagues of six distinguished SEAS alumni gathered with Dean David Dolling last October to honor the six as they were inducted into the GW Engineering Hall of Fame. These new members join 60 others who have been inducted into the Hall of Fame since it was established in 2006.

The Hall of Fame celebrates SEAS alumni and friends who have made significant achievements in engineering, technology, management, or public service. Although the 2016 honorees came to SEAS from different backgrounds and pursued a variety of paths afterwards, they share the common trait of being “individuals who bring distinction to GW through their achievements and their contributions to their professions,” according to Dean Dolling. The newest members of the GW Engineering Hall of Fame are:

William “Bill” Austen (MS '84) is president and chief executive officer of Bemis Company, Inc., a global supplier of packaging used by leading food, consumer products, healthcare, and other companies. Mr. Austen joined Bemis in 2000 and has taken on leadership positions of greater and greater responsibility over his 16 years with the company. Prior to joining Bemis, he had a 20-year career with General Electric, where he led and grew several of GE's domestic and global business units in the manufacturing and service sectors.

Bahram Javidi (BS '80) is Board of Trustees Distinguished Professor at the University of Connecticut, where he has been a member of the Department of Electrical and Computer Engineering faculty since 1988. Dr. Javidi is a first-rate scholar with a prodigious body of work, including nine books, more than 900 publications,



Left to right: Bahram Javidi, Rodolfo Rodriguez, Gerald McNichols, President Steven Knapp, Christyl Johnson, William Austen, and Cagatay Özdogru

and 30 patents. He has been named Fellow of eight professional societies and in 2007 won the Humboldt Prize, Germany's highest research award for senior scientists and scholars in all disciplines.

Christyl Johnson (Ph.D. '12) is the deputy center director for technology and research investments at NASA's Goddard Space Flight Center. Dr. Johnson joined NASA in 1990 as the associate director for exploratory missions in the Office of Earth Science. She has held several positions since then, including serving on a two-year detail as the executive director of the National Science and Technology Council in the White House Office of Science and Technology Policy, and later as Goddard's deputy director for science and technology.

Gerald “Mac” McNichols (D.Sc. '76) is the chairman and chief executive officer of McNichols & McNichols, Inc. He is also a private angel investor and philanthropist with more than 40 years of experience in management and consulting. Dr. McNichols founded Management Consulting and Research, Inc. in 1977, and over the course of his career he acted as an advisor to the chief executive officer or chief operating officer of several middle-market companies. His extensive list of awards and honors includes, most notably, the Lifetime Achievement Award, which he received in 2000 from the Society of Cost Estimating and Analysis.

Cagatay “Chaatai” Özdogru (MS '91) is the chief executive officer and a board member of Esas Holding, one of Turkey's leading investment companies. After serving in positions with IBM, France Telecom Group, and Koc-Unisys, Mr. Özdogru began working for Esas Holding's parent company in 2002, and was responsible for helping it with the privatization of Turk Telekom. In addition to his many responsibilities at Esas Holding, he is the chairman of the Turkish-Swedish Business Council and a board member of the Turkish-French Chamber of Commerce.

Rodolfo “Rudy” Rodriguez (MS '69) is the founder and chief scientific officer of Advanced Animal Diagnostics and a gifted and prolific researcher and inventor. He holds 30 U.S. patents and more than 60 international patents, and is a four-time winner of the R&D 100 Award for one of the “100 Most-Significant New Technical Products of the Year.” During his career, he has been involved in the development and commercialization of several products that have created entirely new industry segments. Among them are the first automated blood cell separator, the first random access chemistry analyzer, and the world's most successful physician's office hematology system. He is also a member of the National Academy of Engineering. (*Learn more about Mr. Rodriguez on page 13.*)



Gazelle Hashemian Kimiavi

NAC Update

I began a two-year term as chair of the SEAS National Advisory Council (NAC) last April, and as chair, I'm very happy to share with my fellow SEAS alumni this update on the council's priorities and recent activities.

At the fall NAC meeting, the council set goals and provided recommendations to Dean Dolling for priority initiatives within SEAS. One of the goals we set together is to help SEAS become the number one school in the country to graduate women with undergraduate degrees in engineering and computer science. SEAS is currently ranked fifth nationally, and we are committed as alumni to helping it reach the top spot by assisting the dean in recruiting and retaining top female students.

As a council, we also discussed the school's efforts to bolster innovation and entrepreneurship inside and outside the classroom. SEAS has a number of new and ongoing initiatives in this important area, and the NAC looks forward to continuing to collaborate with Dean Dolling on innovation and entrepreneurship efforts.

In July 2016, we welcomed three new members to the NAC, whom I am happy to introduce:

Michael Fleming is Of Counsel to Irell & Manella LLP. He is the former chief administrative patent judge of the Patent Trial and

Appeal Board of the United States Patent and Trademark Office (USPTO). Since leaving the bench, Mr. Fleming has provided strategic advice and counsel to companies and universities in complex patent proceedings and has represented parties at the USPTO. Mr. Fleming has extensive experience advising clients in all areas of strategic patent prosecution and management. With his background in the USPTO, his expertise extends to a wide range of technologies, including electrical, mechanical, chemical, and life sciences fields. He received his Master of Science degree in electrical engineering in 1982 from SEAS.

Barbara Fleming received a Bachelor of Science degree in applied mathematics from GW's Columbian College of Arts and Sciences in 1981 and a Master of Science degree in computer science from SEAS in 1985. Ms. Fleming is a former director at the Department of Defense's (DoD) Defense Information Systems Agency and a former cyber security advisor with the Office of the DoD's Chief Information Officer. Ms. Fleming is very interested in working with women in science and engineering and has thoroughly enjoyed her interactions with students at SEAS events. She served as one of 18 alumnae at the inaugural GW Women in Engineering event in 2016 and has served twice as a judge at the annual Pelton Senior Design Showcase.

Christopher Wiernicki is an internationally recognized naval architect and business leader. He currently serves as the chairman, president, and chief executive officer of ABS and the chairman of ABS Group. He joined ABS in 1993 and has served in a number of positions, most notably as ABS president and chief operations officer, ABS Europe Ltd. president and chief operations officer, and ABS chief technology officer. Prior to ABS, Mr. Wiernicki was president and chief information officer of Designers and Planners Inc., a leading naval architecture firm in the U.S. Mr. Wiernicki received his Master of Science degree in structural engineering from SEAS in 1983. In 2013, he was inducted into the GW Engineering Hall of Fame.

Michael, Barbara, and Chris bring extraordinary industry knowledge to the NAC and share a genuine interest in building a strong future for engineering at GW. I look forward to working with them this term and to the wisdom I know they will share with the NAC and Dean Dolling.

Thank You

SEAS thanks our alumni who donated their time to GW during calendar year 2016. The following alumni volunteered on campus or throughout the country or world during 2016:

Erkinay Abiliz

Sana Al-Hajj

Emily Alexander

William Alexander

Gregory Allen

W. Scott Amey

Errol Arkilic

Paige Atkins

Danielle Barsky

Joseph Blackford

William Brittle

Leon Brujis

William Burke

Olga Chen

Edward Chesnut

Dean Coclin

Alix Cohen

Gennaro "Gene" Colabatistto

Terry Collins

Avani Dhamsania

Minha Do

Thomas Doherty

Pascale Dumit

Mehrab Erfani

Loretta Evans

Barbara Fleming

Michael Fleming

Sukhdeep "Gulu" Gambhir

Amit Garg

Dawn German

Solome Girma

Alpana Gowdar

Randolph "Randy" Graves

Jon Halpern

Alexandra Halvordson

Gazelle Hashemian Kimiavi

Reginald Herndon

William Hom

Richard Hu

Samantha Hurley
 Naeem Hussain
 Kumar Jeev
 Loretta Jeffrey-Idun
 Ashok Jha
 Rebecca Jimenez
 Kunal Johar
 David Karlgaard
 Sassan Kimiavi
 Patrick Lacey
 Rory Lamond
 Dov Levy
 Renato Levy
 Renee Lewis
 Colleen Lingley-Papadopoulos
 Anna Long
 Larry Lu
 Joseph Mancuso
 Jason March
 Michael McLay
 Kristen Metropoulos

Thomas Mooney
 Get Moy
 Claire Nelson
 Richard "Dick" Norman
 Kristy Ortiz
 Hetal Patel
 Ketan Patel
 Harold Rappoport
 Manny Rivera
 Matthew Rogers
 Joseph Rubin
 Randa Samaha
 Justin Schorr
 Fatima Senghore
 Thomas Sgroi
 Winslow Sheffield
 Sunil Shrestha
 Lolita Street
 T. Richard Stroupe
 Natalie Sutherland
 Mansi Talwar

Robert Tamaru
 Aida Tessema
 Shravalya Tirumala
 Howard Tischler
 Charles Turner
 William "Bill" Varner
 Sarita Venkatakrishnan
 Robert Versaw
 Indrajeet Viswanathan
 Philip Vitale
 Ashley Wain
 Anastasia Wengrowski
 Carl Wick
 Mary Zikria

JOIN THE GW LEGACY CHALLENGE

The GW Legacy Challenge is an innovative initiative that will provide a cash match for donors who make new planned gift commitments to the School of Engineering and Applied Science (SEAS), allowing the impact of your giving to be felt now, even though the University will not receive funds from your planned gift, in most cases, for years to come.



You document
your planned gift
using the Legacy
Challenge Gift
Confirmation Form.



Legacy Challenge
Match Funds
(10% of the value
of your planned gift
up to \$10,000).



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impact to
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interest at
GW.



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impact
with your
planned
gift.

If you document a gift in your will or trust, beneficiary designation from a retirement account, charitable gift annuity, or charitable trust to SEAS, then you can immediately direct Legacy Challenge matching funds to a cause you care about, such as scholarships or a specific academic department. For every \$10 of your pledged planned gift, \$1 of matching funds (with a cap of \$10,000) will be directed to the SEAS purpose you select, thanks to a generous group of GW alumni and friends.

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WASHINGTON, DC

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GWLegacyChallenge](http://go.gwu.edu/GWLegacyChallenge).

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 EMAIL: pgiving1@gwu.edu



DAR3001

Happenings

Vittal Anantatmula, MS '95, D.Sc. '04 (engineering management), is a professor in the College of Business at Western Carolina University. He was promoted to the rank of full professor in 2014 and received tenure in 2011. He also was appointed a global guest professor at Keio University (Japan), with a term from 2015 to 2020. He currently is co-authoring *Contemporary Project Management*, 4th edition with Tim Kloppenborg.

Capt. Michael Blount, certificate '03 (water resources), was sworn in as national president of the Society of American Military Engineers (SAME) in May 2016. As SAME president, Capt. Blount leads a 47-member National Board of Direction and a global organization of 105 posts and more than 30,000 members from across the military, public, private, and academic sectors.



Jennifer Boykin, MS '94 (engineering management), received a YWCA Women of Distinction Award in April 2016. The award honors women who have achieved, overcome, and blazed a trail for other women through their professional leadership,

volunteer efforts, and civic involvement. Jennifer is vice president of engineering and design for Newport News Shipbuilding, a division of Huntington Ingalls Industries.

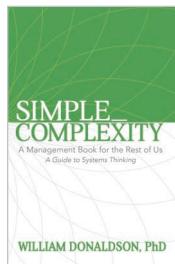
Michael Chua, BS '85 (civil engineering), was promoted in November 2016 from bridge engineer to senior associate at Dewberry, a professional services firm. Michael is a professional engineer in MD and VA.



Dean Coclin, BS '84 (electrical engineering), recently returned from Argentina, where he gave the talk "Latest Trends in Web Security" at the Segurinfo Argentina 2017 cyber security conference.

Damon Coppola, BS '95 (CCAS), MS '03 (engineering management), and his co-authors recently published new editions of three books: *Homeland Security: The Essentials*,

2nd Edition (Elsevier); *Introduction to Emergency Management*, 6th Edition (Elsevier); and *Communicating Emergency Preparedness: Practical Strategies for the Public and Private Sectors*, 2nd Edition (CRC Press).



William "Willy" Donaldson, Ph.D. '15 (systems engineering), recently published the book *Simple_Complexity*. Willy is a professor of management at the Joseph W. Luter, III School of Business at Christopher Newport University. He is also a member of the International Council on Systems Engineering, where he chairs the Enterprise Systems working group.



Howard Eisner, D.Sc. '96, presented the tutorial "Beyond Thinking outside the Box for Systems Engineers and Entrepreneurs" to the Chesapeake Chapter of the International Council on Systems Engineering last September. He also gave an eight-week course for the Osher Lifelong Learning Institute, with a focus on thinking outside the box in science and business. Dr. Eisner retired in 2013 as professor emeritus of engineering management and distinguished research professor.

Steven Fischer, BS '91 (systems engineering), has been promoted to the grade of Colonel, United States Air Force.

Michael Fleming, MS '82 (electrical engineering), was named a 2016 IP Trailblazer by *The National Law Journal*. As the former chief administrative patent judge of the Patent Trial and Appeal Board, Michael was honored for helping Congress draft the post-grant provisions of the America Invents Act and playing a critical role in the creation of the IPR statute. Michael also is a member of the SEAS National Advisory Council.



Mahmood Husain, MS '14 (engineering management), works as a business development manager with Vericert in the Kingdom of Bahrain. He also is working on his Ph.D. and is

a part-time lecturer at a private university in Bahrain. Mahmood writes that it is a pleasure to remain connected with GW alumni.



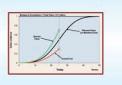
Omer Iqbal, MS '93 (medical engineering), is the general manager of turn-key projects in hospital engineering and a board member at Medvision Enterprises in Lahore, Pakistan. Earlier this year, he received the 2017 American College of Clinical Engineering's Professional Achievement in Management/Managerial Excellence Award in Plymouth, PA. He is married to Amna Omer and has two daughters, Rameen and Jassiya.



Kevin Kelly, MS '97 (engineering management), was named chair of The Intelligence & National Security Alliance's (INSA) Technology and Innovation Council in January 2017. INSA's

Technology and Innovation Council provides cross-collaborative opportunities between academia, government, and industry to address national security challenges. Kevin will lead these efforts in his new capacity. Kevin also is a member of the SEAS National Advisory Council.

The Principles of Earned Value Management



A Cost and Schedule Control System
James Kudzal

James Kudzal, MS '82 (engineering administration), authored the recently published combination textbook and reference book *The Principles of Earned Value Management: A Cost and Schedule Control System*.

Earned Value Management is a tool used by project managers to plan, monitor, and control their budgets and schedules. It is widely used in industry and is required by the federal government in many of its acquisition contracts.

In 2017, for the eighth consecutive year, **Elliott Kugel, MS '83 (computer science)**, was named to *Barron's* Top 1,200 Financial Advisors. He also was ranked #13 in the state of NJ. In addition, he was recognized in *Forbes* magazine's inaugural list of Top 200 Advisors in the country. Elliott is a managing director of investments at Merrill Lynch in Bridgewater, NJ, and resides in Skillman, NJ.

Chung-Shing Lee, D.Sc. '97 (engineering management), was appointed dean of the School of Business at Pacific Lutheran University (Tacoma, WA) in July 2016.

In 2016, Dovel Technologies was ranked #12 in the *Washington Business Journal's* 50 Fastest Growing Companies in the DC region. This was the second year in a row Dovel Technologies made the list. **Dov, MS '83 (computer science), and Elma Levy** are the company's co-founders and are members of the SEAS National Advisory Council.



Ronald Luman, D.Sc. '98 (systems engineering), the chief of staff at Johns Hopkins University Applied Physics Laboratory, has been appointed a Fellow of the International Council on Systems Engineering.

Faisal Mohd-Yasin, BS '99, MS '02 (electrical engineering), has been promoted to the rank of senior lecturer at Griffith University in Brisbane, Australia. This is the equivalent of a tenured associate professor position in the North American system.



Ron Sasiela, MS '00 (engineering management), joined the State of California Bar's Intellectual Property Law Section as an associate member in October 2016.

During the same month, he won the Bronze Award in the Beverly Hills Inaugural Hummus Festival and Contest. On the acting front, Ron received his first acting award for his portrayal of Seymour Billingsly in an annual community show presented by the STOP SENIOR SCAMS Acting Program. He subsequently was invited to make a presentation to Los Angeles Mayor Eric Garcetti during an event at City Hall to promote the mayor's "Purposeful Aging" initiative.

Vishak Sivadas, MS '12 (mechanical engineering), won a Spotlight on New Technology Award in the oil and gas industry at the Offshore Technology Conference in 2016. The awards are given for a new and innovative product that was developed to meet



customer needs. Vishak won the award for the SkoFlo Industries' Subsea Back Pressure Regulators, which are anti-siphoning, self-regulating devices that create back pressure in chemical injection lines to prevent uncontrolled delivery of chemicals into production wells.



William "Bill" Varner, BS '73 (electrical engineering), received an Outstanding Electrical and Computer Engineer Award from Purdue University in October 2016. The award recognizes Purdue alumni who have demonstrated exemplary accomplishment, leadership, and service to their community. Only 223 distinguished alumni have received the award since it was established in 1992. Bill received his MS degree in electrical engineering from Purdue. He is a member of the SEAS National Advisory Council.

After nearly 15 years at the Naval Facilities Engineering Command, **Tyler Wean, BS '01 (civil engineering), MS '03 (engineering management)**, has moved to a new position as a project integrator in the Office of Acquisition and Project Management at the Department of Energy's National Nuclear Security Administration.

Christopher Wiernicki, MS '83 (structural engineering), was honored for his outstanding contributions to the maritime industry in May 2016, when he was inducted to the International Maritime Hall of Fame at the Maritime Association of the Port of New York and New Jersey's 23rd annual event. Also in May, he gave the commencement speech at SUNY Maritime College, where he was presented with an honorary Doctor of Science degree from the State University of New York. Christopher is currently the chairman, president, and CEO of ABS, and is a member of the SEAS National Advisory Council.



John Wood, MS '10, Ph.D. '13 (systems engineering), founded Cardinal Point Healthcare Solutions in 2017 and serves as its CEO. John and his team of experts help clients operationalize data to drive strategic initiatives in the healthcare arena.



In Memoriam:



Walter Goetz, MS '74 (engineering administration), passed away

December 19, 2016. Walt worked for 37 years in the Center for Devices and Radiological Health at the Food and Drug Administration in Rockville, MD, and received the Career Distinguished Service Award from the FDA. While at the FDA, he earned his Master of Science degree at SEAS. He subsequently designed an engineering contracting course, wrote the textbook, and taught the course for 37 years, concurrent with his career at the FDA.

Paul David Travesky, BS '66, MS '72, passed away on March 27, 2017. He had 35 years of federal service before retiring in 1988 as the director of the U.S. Army Night Vision and Electro-Optics Laboratory. Author of numerous publications and recipient of several awards, he worked for a member of the House Armed Services Committee under the Legislative Fellowship Program, and was the chair of a NATO panel. He went on to work as a consultant for major defense contractors, and served as vice-president, advanced technology, for Lockheed Martin Fairchild Systems.

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