



NATIONAL ACADEMY OF ENGINEERING

2018 ANNUAL MEETING

September 30–October 1, 2018
Washington, DC

CYBERSECURITY



The National Academies of
SCIENCES • ENGINEERING • MEDICINE



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10:00 am–4:00 pm **Registration** **NAS 120**

10:30 am–11:45 am **Brunch Buffet** **West Lawn**

10:30 am–11:45 am **Tax and Financial Planning Seminar** **Members' Room**
(advance registration required; brunch included)

Led by Jamie M. Killorin, CPA/PFS, CGMA, CFP®
Director of Gift Planning, National Academies of Sciences, Engineering, and Medicine

The Tax Cuts and Jobs Act of 2017 changed the rules for tax, financial, and charitable planning. Learn what these new rules mean for you and strategies for your planning.

Jamie Killorin is a licensed certified public accountant (CPA/PFS) and certified financial planner (CFP®) with over 20 years of tax, financial advisory, and wealth management experience. She offers seminars on financial topics, charitable planning, and professional ethics and has a doctorate from George Washington University in human and organizational learning.

12:00 noon–2:00 pm **PUBLIC PROGRAM** **Fred Kavli Auditorium**



Chair's Remarks
Mr. Gordon R. England
Chair, National Academy of Engineering

Gordon R. England is chair of the board of PFP Cybersecurity and a partner of Dyno-Tech, LLC. Previously, he served as deputy secretary of defense (2005–09) and, as secretary of the Navy (2001–06), was credited with developing successful surge plans for America's fleet, strengthening the ties between the Navy and Coast Guard, and increasing assistance to the US Marines on the front lines in Iraq. He was the first deputy secretary of the Department of Homeland Security (2003).

Mr. England's business career spanned over 40 years as an engineer and senior executive, largely at General Dynamics, where he was executive vice president of the Information Systems & Technology Sector (1997–2001); president of the GD Fort Worth Aircraft Company (later Lockheed) (1991–95), responsible for all domestic and international aircraft programs, including the F-16 fighter; president (1990–91) and vice president, engineering (1986–90), of GD Land Systems Company; and director of avionics of the Fort Worth Company (1980–86). He began his career at Honeywell, where he was an engineer on the Project Gemini space program.

Mr. England was elected to the NAE in 2012 for advances in digital avionics for aircraft, land, and naval platforms. He cochaired the Academies' Government-University-Industry Research Roundtable and served on the NAE Aerospace Engineering Peer Committee, organizing committee for the Workshop on Trends in the Innovation Ecosystem: Can Past Successes Help Inform Future Strategies?, Committee on Talent: Assessing and Meeting National Workforce Needs, and Committee on Fault Isolation.



He has been active in a variety of civic, charitable, and government organizations, including serving as a city councilman. He chairs the board of the US Naval Institute Foundation, serves on the boards of the Community Learning Center and Glilot Capital Partners, advisory council of Business Executives for National Security, and University of Maryland trustees board, and is an honorary trustee on the board of directors of the National Museum of the Pacific War. He is vice president of the Academy of Medicine, Engineering, and Science of Texas. He served on the USO board of governors, DOD Defense Science Board, MERRA—Michigan R&D Cooperative (chair), Michigan Chapter of ADPA (president), Defense Manufacturing Board on Concurrent Engineering, Engineering Board of Advisors of the Universities of Texas and Michigan and Oakland University, board of Goodwill (vice chair), and CACI board of directors.

Mr. England has been recognized for numerous professional and service contributions, with an honorary doctor of science, Oakland University (2003), IEEE Centennial Award, Commander Cross—Republic of Poland, Silver Knight of Management Award from the National Management Association, DOD Distinguished Public Service Award, Henry M. Jackson Award, NIDA Dwight Eisenhower Award, USCG Distinguished Public Service Award, Navy League David M. Thompson Award, Naval Order of US Admiral George Dewey Award, 2005 Charles Francis Adams Award, Department of VA Exceptional Service Award, Armed Forces Foundation Award, Boy Scouts of America Distinguished Citizen Award Silver Beaver, Union League Lincoln Award, Goodwill Industries Person of the Year, and USO Distinguished Citizen Award. He is a member of Beta Gamma Sigma (business), Omicron Delta Kappa (leadership), and Eta Kappa Nu (engineering).

He received a BS degree in electrical engineering from the University of Maryland, College Park in 1961, and an MBA from Texas Christian University in 1975.

President's Address
Dr. C. D. Mote, Jr.
President, National Academy of Engineering
Vice Chair, Governing Board of the National Research Council

C. D. Mote, Jr. is president of the National Academy of Engineering and Regents' Professor on leave from the University of Maryland, College Park.

Dr. Mote is a native Californian who earned his BS, MS, and PhD degrees at the University of California, Berkeley in mechanical engineering between 1959 and 1963. After a postdoctoral year in England and three years as an assistant professor at the Carnegie Institute of Technology in Pittsburgh, he returned to Berkeley to join the faculty in mechanical engineering for the next 31 years. He and his students investigated the dynamics, stability, and control of high-speed rotating and translating continua (e.g., disks, webs, tapes, and cables) as well as biomechanical problems associated with snow skiing. He coined the area called "dynamics of axially moving materials" encompassing these systems. Fifty-eight PhD students earned their degrees under his mentorship. He held an endowed chair in mechanical systems at Berkeley and chaired the Mechanical Engineering Department from 1987 to 1991, when the National Research Council (NRC) ranked its graduate program effectiveness highest nationally. Because of his success at raising funds for mechanical engineering, in 1991 he was appointed vice chancellor to create and lead a \$1 billion capital campaign, which raised \$1.4 billion.

In 1998 Dr. Mote was recruited to the presidency of the University of Maryland, College Park, a position he held until 2010 when he was appointed Regents' Professor. His goal for the university was to elevate its self-expectation of achievement and its national and global positions through proactive initiatives. During his tenure the number of Academy members on the faculty tripled, three Nobel laureates were recognized, and an accredited school of public health and a new department of bioengineering were created. In addition, he founded a 130-acre research park next to the campus, faculty research funds increased by 150 percent, and partnerships with surrounding federal agencies and with international organizations expanded greatly. The number of students studying abroad tripled, and he created an annual open house day that attracts over 100,000 visitors, founded a charitable foundation for the campus whose board of trustees launched and led a successful \$1 billion capital campaign, and took to lunch every student that wanted to go. The Academic Ranking of World Universities ranked the campus #36 in 2010 and its Engineering School #13.

The NAE elected him to membership in 1988 and to the positions of councillor (2002–08), treasurer (2009–13), and president for a six-year term beginning July 1, 2013. He has served on the NRC governing board executive committee since 2009.

Dr. Mote's recognitions include the NAE Founders Award, the American Society of Mechanical Engineers (ASME) Medal, and the Humboldt Prize of the Federal Republic of Germany. He is an honorary fellow of ASME, honorary member of the American Society for Engineering Education, and fellow of the American Academy of Arts and Sciences, American Academy of Mechanics, Acoustical Society of America, and American Association for the Advancement of Science. He was elected to the Chinese Academy of Engineering in 2015, made an honorary academician of the Academia Sinica, Taiwan, in 2016, and in 2017 elected a fellow of the National Academy of Inventors. He holds four honorary doctorates and three honorary professorships.

As president of the NAE Dr. Mote is committed to ensuring highly competitive talent in the US engineering workforce, facilitating public understanding of engineering, demonstrating how engineering creates a better quality of life, and engaging the Academy in global engineering issues in support of national interests. A highlight of global engineering engagement is the promotion of the NAE's 14 Grand Challenges for Engineering, whose solutions are needed to achieve the global vision "Continuation of life on the planet, making our world more sustainable, safe, healthy, and joyful."

Induction Ceremony for the NAE Class of 2018



Dr. Alton D. Romig, Jr.
Executive Officer, National Academy of Engineering

Alton D. Romig, Jr. is the executive officer of the National Academy of Engineering. In this capacity he is the chief operating officer responsible for the program, financial, and membership operations of the Academy, reporting to the NAE president.

He was previously vice president and general manager of Lockheed Martin Aeronautics Company Advanced Development Programs, better known as the Skunk Works®. He spent the majority of his career at Sandia National Laboratories, operated by the Lockheed Martin Corporation, having joined Sandia as a member of the technical staff in 1979 and moved

through a succession of R&D management positions leading to his appointment as executive vice president in 2005. He served as deputy laboratories director and chief operating officer until 2010, when he transferred to the Skunk Works.

Dr. Romig serves or has served on a number of advisory committees, including those at the University of Washington, MIT, Ohio State, Purdue, Georgia Tech, the Colorado School of Mines, and Sandia National Labs. He is also visiting associate of applied physics and materials science at Cal Tech. He serves on the board of directors of Football Research, Inc., a nonprofit created and supported by the National Football League to review engineering technology to improve the safety of the sport.

Dr. Romig is a fellow of TMS, IEEE, AIAA, and AAAS and a fellow and honorary member of ASM International. He was elected to the NAE in 2003 and the Council on Foreign Relations in 2008. He was awarded the ASM Silver Medal for Materials Research in 1988. He received his BS (1975), MS (1977), and PhD (1979) in materials science and engineering from Lehigh University.

2:00–2:30 pm

Break (NAE Class of 2018 and Anniversary Members group photo)

Class of 2018 and 25th Anniversary Members (Class of 1993) proceed with NAE staff guidance to the Constitution Avenue Lobby.

2:30–4:00 pm

Awards Program

Kavli Auditorium

2:30–2:50 pm

2018 Simon Ramo Founders Award Recipient



Professor Thomas Kailath
Hitachi America Professor of Engineering Emeritus
Department of Electrical Engineering
Stanford University

The Simon Ramo Founders Award, the oldest award presented by the National Academy of Engineering, was established in 1965 to honor an outstanding NAE member or foreign member who has upheld the ideals and principles of the NAE through professional, educational, and personal achievement and accomplishment.

Thomas Kailath, recipient of the 2018 Simon Ramo Founders Award, is being honored "for pioneering contributions to diverse fields of electrical engineering and for leadership in technology commercialization and in engineering education, guiding a stellar array of young scholars."

Professor Kailath began his career at the Digital Communications Group at the Jet Propulsion Laboratory in Pasadena, where he also held a visiting appointment at Caltech. In 1963 he joined Stanford University as an associate professor of electrical engineering, was promoted to professor in 1968, and in 1988 he was appointed the first holder of the Hitachi America Professorship in Engineering. As director of the Stanford Information Systems Laboratory (1971–81), he built it into a leading center for communications, control, and signal processing research before becoming associate chair of the Electrical Engineering Department (1981–87). He assumed emeritus status in 2001, but was recalled to continue his research and writing.

Professor Kailath's research and teaching have spanned a number of engineering and mathematical disciplines, with the major focus of his research changing roughly every decade. In the 1960s he contributed to information and communication theory. Next he turned his attention to state space estimation and control. In the 1980s he led a large research group in four major areas: smart antenna array processing, adaptive filtering theory, special purpose VLSI architectures for signal processing, and displacement structure theory for fast matrix and linear algebra computations. In the 1990s his group made contributions to two areas of semiconductor manufacturing: rapid thermal processing and optical lithography, where they showed how to break the widely believed 100 nm barrier for the smallest achievable critical dimensions.

His work with a stellar array of over 100 doctoral and postdoctoral scholars has led to over 300 journal papers, a dozen patents, and several books and monographs, including the textbooks *Linear Systems* (1980) and *Linear Estimation* (2000). With his students, Professor Kailath cofounded several companies, two of which went public, while the others were acquired; his former students have formed over 20 companies themselves.

Professor Kailath received a 2012 National Medal of Science "for transformative contributions to the fields of information and system science, for distinctive and sustained mentoring of young scholars, and for translation of scientific ideas into entrepreneurial ventures that have had a significant impact on industry." In 2017 he was honored with the Marconi Society's Lifetime Achievement Award. He has also received the IEEE's Education and Signal Processing Medals and its highest award, the IEEE Medal of Honor, "for exceptional contributions to the development of powerful algorithms for communications, control, computation, and signal processing." Other major recognitions include election to the NAE, National Academy of Sciences, and American Academy of Arts and Sciences; foreign membership in, among others, the Royal Society of London, Royal Spanish Academy of Engineering, Indian National Academy of Engineering, and Indian National Science Academy; the Padma Bhushan, India's third-highest civilian award, presented by the country's president, and a BBVA Foundation Frontiers of Knowledge Award for Information and Communication Technologies. In addition to being a fellow of the IEEE, Institute of Mathematical Statistics, Society for Industrial and Applied Mathematics, and American Mathematical Society, Professor Kailath has held Guggenheim, Churchill, and Humboldt fellowships.

He received his BE (telecom) from the College of Engineering, Pune, India, in 1956 and MS and ScD from the Massachusetts Institute of Technology in 1959 and 1961, as well as several honorary degrees, most recently from the Technion and the National Technical University of Athens.

2:50–3:10 pm

2018 Arthur M. Bueche Award Recipient

Dr. Venkatesh Narayanamurti
Benjamin Peirce Research Professor of Technology and Public Policy
Paulson School of Engineering and Applied Sciences
and Kennedy School of Government
Harvard University

The Arthur M. Bueche Award of the National Academy of Engineering recognizes an engineer who has been actively involved in determining US science and technology policy, promoting technological developments, and contributing to the enhancement of relations between industries, government, and universities.



Venkatesh Narayanamurti, recipient of the 2018 Arthur M. Bueche Award, is being honored "for seminal contributions to condensed matter physics and visionary leadership of multidisciplinary research in industry, academia, and national labs that generated research and engineering advances."

Venkatesh "Venky" Narayanamurti is the Benjamin Peirce Research Professor of Technology and Public Policy at Harvard. He was previously the John L. Armstrong Professor and founding dean of the School of Engineering and Applied Sciences (SEAS), professor of physics, dean of physical sciences at Harvard, and, in 2009–15, director of the Science, Technology and Public Policy Program at the Harvard Kennedy School. He was dean of the University of California, Santa Barbara (UCSB) College of Engineering (1992–98), vice president for research at Sandia National Laboratories (1987–92), and spent much of his scientific research career at AT&T Bell Laboratories (1968–87), where he became director of the Solid State Electronics Research Laboratory (1981–87).

He is credited with developing the field of phonon optics—the manipulation of monoenergetic acoustic beams at terahertz frequencies—and is active in the field of semiconductor nanostructures.

As dean of Harvard's SEAS for 10 years, he directed the renewal and expansion of the former division, its transition to a school, the recruitment of junior and senior faculty, and a 60 percent growth in sponsored research. He was an early champion of interdisciplinary initiatives and collaboration, reaching out to colleagues in the Faculty of Arts and Sciences as well as Harvard's Medical School, Business School, and School of Public Health to establish new partnerships. Under his leadership, SEAS faculty developed creative and innovative programs to attract students, including new courses of study in computer science, electrical engineering, and bioengineering at the graduate and undergraduate levels.

At UCSB he recruited a large number of faculty, fostered interdisciplinary research, and nurtured entrepreneurship and collaborations with industry. His name lives on in the university's Venky Narayanamurti Entrepreneurial Leadership Award ("the Venky") and first endowed chair in computer science.

Dr. Narayanamurti has authored more than 240 scientific papers in different areas of condensed matter and applied physics and technology innovation policy. He lectures widely on solid state, computer, communication, and energy technologies as well as on the management of science, technology, and public policy, and has served on numerous advisory boards of the federal government, research universities, professional societies, national laboratories, and industry.

In addition to the NAE, he is an elected member of the Royal Swedish Academy of Engineering Sciences and a fellow of the American Academy of Arts and Sciences, American Physical Society, American Association for the Advancement of Science, Institute of Electrical and Electronics Engineers, Indian Academy of Sciences, and Indian National Academy of Engineering.

He earned his bachelor's (1958) and master's (1960) degrees from St. Stephen's College, Delhi University, and his PhD (1965) from Cornell University, all in physics.

3:10–4:00 pm

2018 Bernard M. Gordon Prize for Innovation in Engineering and Technology Education Lecture



The Bernard M. Gordon Prize for Innovation in Engineering and Technology Education recognizes new modalities and experiments in education that develop effective engineering leaders. It focuses on innovations such as curricular design, teaching methods, and technology-related learning that strengthen students' capabilities and desire to grow into leadership roles.

This year's Bernard M. Gordon Prize for Innovation in Engineering and Technology Education recognized Stanford University educator **Paul G. Yock** "for the development and global dissemination of Biodesign, a biomedical technology program creating leaders and innovations that benefit patients."

Paul G. Yock is the Martha Meier Weiland Professor of Medicine and founding cochair of Stanford University's Department of Bioengineering, with a courtesy appointment in the Department of Mechanical Engineering. He is also the founder and director of the Stanford Byers Center for Biodesign. He previously founded Cardiovascular Imaging Systems (acquired by Boston Scientific) and cofounded several other medical technology companies. The main focus of his research has been intravascular ultrasound.

Dr. Yock is known internationally for his work in inventing, developing, and testing new devices, including the Rapid Exchange™ stenting and balloon angioplasty system, now the primary system in use worldwide. He also invented a Doppler-guided access system known as the Smart Needle™ and PD-Access™. Among his 50 US patents, he wrote the fundamental patents for mechanical intravascular ultrasound imaging, for which he helped conduct the initial clinical trials.

He has authored over 300 peer-reviewed publications, chapters, and editorials, and two textbooks. Recent awards include the Transcatheter Therapeutics (TCT) Career Achievement Award, the American College of Cardiology Distinguished Scientist Award, and an honorary doctorate from Amherst College. He is a member of the NAE and Association of American Physicians.

After completing his undergraduate and graduate studies at Amherst College and Oxford, respectively, Dr. Yock received his MD from Harvard Medical School, followed by internship and residency training at the University of California, San Francisco, and a fellowship in cardiology at Stanford. He began his faculty career as an interventional cardiologist at UCSF and moved to Stanford in 1994.

4:00–4:30 pm

Break

4:30–5:30 pm

Plenary Speakers

Introduction
Dr. C. D. Mote, Jr.
President, National Academy of Engineering



Ms. Diane B. Greene
Chief Executive Officer, Google Cloud
Providing Security at Scale in the Cloud and the Regulatory Considerations

Diane Greene is CEO of Google Cloud and a director of Alphabet. Before Google, she cofounded and ran three technology companies: VMware, which she took public for a \$19.1B first-day closing valuation; Vxtreme, a low-bandwidth streaming video company that was bought by Microsoft; and Bebop, a software-as-a-service (SaaS) startup acquired by Google. She previously worked at Sybase, Tandem, and SGI as a software engineer and, before that, as a naval architect in the shipping and offshore oil industries. She also ran engineering for Windsurfer International.

In addition to her service on the board of Alphabet, Ms. Greene is a lifetime member of the MIT Corporation, sits on the supervisory board of SAP, and is a member of the UC Berkeley School of Engineering advisory committee. She served on the board of Intuit from 2006 through 2017.

In 2017 she received the Anita Borg Institute Technical Leadership Award and a University of Vermont honorary doctor of science. In 2018 she was elected to the NAE.

Ms. Greene has an MS in computer science from the University of California, Berkeley, an MS in naval architecture from MIT, and a BS in mechanical engineering from the University of Vermont. She is married with two children and is a lifelong sailor. She was the 1976 Women's National Dinghy Champion.



Mr. Mike Walker
Principal Researcher, Microsoft Research NExT
Securing the IoT Explosion with Automation

Mike Walker is a principal researcher at Microsoft working on security AI. Before joining Microsoft, he led DARPA's Cyber Grand Challenge, a two-year \$58M contest to construct and compete the first prototypes of reasoning cyberdefense AI. In 2016 at the DEF CON hacking contest, these prototypes took their first flight into the game of hackers, Capture the Flag (CTF), landing zero-day exploits and writing patches in a fully autonomous battle.

Mr. Walker has worked in a policy advisory role, testifying to the President's Commission on Cybersecurity and serving as a contributor and panelist to CSIS's Surviving on a Diet of Poisoned Fruit. Before joining DARPA he worked as a research lab leader and principal vulnerability researcher focusing on tools to amplify vulnerability research abilities with the power of supercomputer automation. He has played in DEF CON CTF finals, coached CTF teams, and built CTFs throughout his career.

He received his BS in computer science from Case Western Reserve University.

5:30–7:00 pm

Reception

West Lawn

6:00–9:00 pm

Golden Bridge Society Reception and Dinner
(by invitation)

Offsite

7:00–8:30 am	Continental Breakfast	West Lawn
	Foreign Secretary's Breakfast (by invitation only to the foreign members)	Members' Room
	Home Secretary's Breakfast (by invitation)	Lecture Room
8:30–9:30 am	NAE Business Session (members and foreign members only)	Kavli Auditorium
9:30 am–12:30 pm	Forum: Privacy and Security in the 21st Century – Who Knows and Who Controls?	Kavli Auditorium
	Welcome Dr. C. D. Mote, Jr. President, National Academy of Engineering	
	Dr. Batya Friedman Professor, University of Washington Information School <i>Engineering with Moral and Technical Imagination</i>	
	Ms. Aanchal Gupta Director of Security, Facebook <i>Security at Scale</i>	
	Dr. Lea Kissner Global Lead of Privacy Technologies, Google <i>Building Privacy, Security, and Respect into Systems</i>	
	Mr. Mike Walker Principal Researcher, Microsoft Research NExT <i>Securing the IoT Explosion with Automation</i>	
	Moderator: Mr. Ali Velshi MSNBC Anchor and Business Correspondent NBC News and MSNBC	
	There will be a 20-minute break during the program.	



Batya Friedman is a professor in the Information School and holds adjunct appointments in the Allen School of Computer Science & Engineering and Department of Human-Centered Design and Engineering at the University of Washington. She codirects the Value Sensitive Design Lab and the UW Tech Policy Lab.

Dr. Friedman pioneered value sensitive design (VSD), an approach to account for human values in the design of technology. First developed in human-computer interaction, VSD has since been used in architecture, civil engineering, computational linguistics, computer security, energy, human-robotic interaction, information management, legal theory, moral philosophy, and transportation. Dr. Friedman has worked on technologies and values in a wide range of systems, from security for implantable medical devices to informed consent for cookies and web browsers, reputation in knowledge base systems, privacy in mobile technology, and equitable representation in large-scale computer simulation for land use and transportation planning.

To bring VSD into engineering and tech policy research and practice, she has developed practical methods and toolkits. Among these, *Envisioning Cards* help technologists consider stakeholders, values, time, and pervasive uptake in their technical work; *Security Cards*, with a focus on threat analysis, help to develop a security mindset; and *Diverse Voices* aims to create more inclusive tech policy. Her new book *Value Sensitive Design: Shaping Technology with Moral Imagination* will be published by MIT Press in early spring 2019.

Dr. Friedman is currently working on multilifespan design—generating design knowledge for envisioning and building information systems to support sociotechnical solutions as they unfold over longer periods of time, on the order of 50 or 100 years. *Voices from the Rwanda Tribunal*, which explores the design of information systems to support transitional justice and healing from cyclical violence and genocide, is a first project in this multilifespan design research program.

Among her honors, Dr. Friedman was selected as the University of Washington's University Faculty Lecturer and received the ACM SIGCHI Social Impact Award in 2012. She is also a sculptor and mixed media artist. She received her BA and PhD from the University of California at Berkeley.



Aanchal Gupta is director of security at Facebook, leading a global team responsible for assessing and mitigating security risks across Facebook. Her team provides security guidance to the company's diverse product offerings, including Messenger, Instagram, Oculus, and WhatsApp, and is responsible for ensuring the security of Facebook's corporate infrastructure, defining security policy, red-team exercises, vendor security reviews, and ensuring compliance. She is passionate about building diverse teams, and her team runs security programs and operations that partner with universities to build a diverse pipeline of security experts.

Before joining Facebook, Ms. Gupta was chief information security officer at Microsoft for Skype and Skype for Business. In this role she managed several broad areas, including security, privacy, compliance, online safety, efforts to fight abuse, and business continuity. Before joining Microsoft, she led Yahoo's Global Identity team, contributing to authentication and authorization open standards such as OpenID and OAuth.

Ms. Gupta has more than two decades of experience leading geographically distributed teams developing secure and trustworthy software used by billions. She serves on technical advisory boards for security startups, CloudKnox Security, and ThreatWatch. She is an active speaker at industry and digital innovation events, and has served on the review board for the Grace Hopper and Black Hat conferences.

Growing up in India, Ms. Gupta learned to love math, science, and technology from her dad, an electrical engineer. She is multilingual and holds a master's degree in computer science from San Jose State University and a bachelor's degree in computer engineering from the National Institute of Technology in India. She lives in the San Francisco Bay Area with her husband and son, and you can follow her on Twitter and LinkedIn.



Lea Kissner is the global lead of privacy technology at Google, driven to build respect for users around the world into products and systems. She works with teams across Google and Alphabet to improve the privacy of products, design and build privacy-enhancing infrastructure, and perform novel research into both theoretical and practical aspects of privacy. She has worked at Google for 11 years on projects including logs anonymization, infrastructure security, and privacy infrastructure.

Dr. Kissner is a member of the Advisory Board of the IAPP Privacy Engineering Section and an organizer of the OURSA conference.

She earned a PhD in computer science (with a focus on cryptography) at Carnegie Mellon University and a BS in electrical engineering and computer science from UC Berkeley.



Mike Walker is a principal researcher at Microsoft working on security AI. Before joining Microsoft, he led DARPA's Cyber Grand Challenge, a two-year \$58M contest to construct and compete the first prototypes of reasoning cyberdefense AI. In 2016 at the DEF CON hacking contest, these prototypes took their first flight into the game of hackers, Capture the Flag (CTF), landing zero-day exploits and writing patches in a fully autonomous battle.

Mr. Walker has worked in a policy advisory role, testifying to the President's Commission on Cybersecurity and serving as a contributor and panelist to CSIS's Surviving on a Diet of Poisoned Fruit. Before joining DARPA he worked as a research lab leader and principal vulnerability researcher focusing on tools to amplify vulnerability research abilities with the power of supercomputer automation. He has played in DEF CON CTF finals, coached CTF teams, and built CTFs throughout his career.

He received his BS in computer science from Case Western Reserve University.



Ali Velshi is an anchor and business correspondent for NBC News and MSNBC. He has covered a broad range of breaking news events and global affairs throughout his career, including US presidential elections, ISIL and the Syrian refugee crisis, the Iran nuclear deal from Tehran, the tensions between Russia and NATO from Eastern Europe and the High Arctic, the debt crisis in Greece, the funeral of Nelson Mandela, and the global financial crisis.

Before joining NBC News and MSNBC, he hosted *Ali Velshi On Target*, a nightly primetime show on Al Jazeera America. Before that, he was CNN's chief business correspondent, anchor of CNN International's *World Business Today*, host of CNN's weekly business roundtable *Your Money*, and cohost of CNN's *American Morning*.

An award-winning journalist, Mr. Velshi was honored with a National Headliner Award for Business and Consumer Reporting for "How the Wheels Came Off," a special on the near collapse of the American auto industry. His work on disabled workers and Chicago's red-light camera scandal in 2016 earned him two News and Documentary Emmy Award nominations, adding to a nomination in 2010 for his terrorism coverage. Additionally, he has taken his economic analysis to *Oprah*, *The View*, and *The Daily Show with Jon Stewart*.

Mr. Velshi is the author of *Gimme My Money Back* (Sterling and Ross, 2008) and coauthor, with CNN's Christine Romans, of *How to Speak Money* (Wiley, 2010).

He is a member of the Council on Foreign Relations. Active in the community, he serves on the board of trustees of the Chicago History Museum, and volunteers with New York's Center for Urban Community Services homeless outreach program. Born in Kenya and raised in Canada, Mr. Velshi graduated from Queen's University in Canada, which awarded him an honorary doctorate of laws in 2016.

12:30–1:30 pm

Lunch

West Lawn

12:45–1:30 pm

Testifying Before Congress: A Tutorial

Lecture Room

Lunch buffet served in the East Court



Mr. Christopher King
Executive Director, Office of Congressional and Government Affairs
National Academies of Sciences, Engineering, and Medicine

It is essential that congressional policymakers hear a clear and objective interpretation of what science and technology bring to the policy agenda. This communication is a special type of oral presentation, and several elements are key to its success.

Christopher King is executive director of the National Academies' Office of Congressional and Government Affairs. He was previously acting assistant secretary for Congressional and Intergovernmental Affairs at the US Department of Energy, where he also served as a senior advisor in the Office of Energy Policy and Systems Analysis and director of policy and analysis for the Office of Energy Efficiency and Renewable Energy. Before joining DOE, Mr. King spent over a decade on Capitol Hill, including as the Energy and Environment Subcommittee staff director for the US House Science, Space, and Technology Committee. During his tenure he was chief advisor on DOE matters and involved in a number of successful legislative initiatives, including passage of the America COMPETES Act and establishment of the Advanced Research Projects Agency–Energy (ARPA-E). Mr. King is a graduate of the University of Texas at Austin.

2:00–5:00 pm	Section Meetings NAS Building, 2101 Constitution Avenue NW	
	02 Bioengineering 05 Computer Science 08 Industrial, Manufacturing & Operational Systems 10 Mechanical 11 Earth Resources	Room 125 Board Room Room 280 Lecture Room Room 250
	Keck Center, 500 Fifth Street NW	
	01 Aerospace 03 Chemical 04 Civil 06 Electric Power/Energy Systems 07 Electronics, Communications & Information Systems 09 Materials 12 Special Fields & Interdisciplinary	Room 208 Room 106 Room 100 Room 207 Room 206 Room 101 Room 105
6:30–7:30 pm	Reception	East Ballroom, Mayflower Hotel
7:30–midnight	Dinner and Dancing (black tie optional)	Grand Ballroom, Mayflower Hotel
The Mayflower Hotel is at 1127 Connecticut Avenue NW in downtown Washington. As ever, dance music will be provided by the popular Odyssey Band.		

MEETING SERVICES

- Food Service**

Efforts are made to provide healthy, nutritionally balanced meals at all meetings. If you have special dietary restrictions or any questions about food service, please see Ervin Pinckney in the registration room (NAS 120).
- Information Desk**

The NAE Information Desk is in the Great Hall of the NAS Building. Staff will be available to provide assistance and answer questions about the annual meeting and the NAE membership.
- Logo Items and Rosettes**

NAE logo items are available for purchase at the NAE Store in NAS 118.
- Lost and Found**

Lost and found is located in the registration room (NAS 120).
- Medical Assistance**

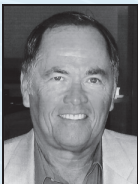
For medical assistance go to the Information Desk in the Great Hall of the NAS Building. A registered nurse will be onsite.
- Smoking Policy**

Smoking is not permitted in any building of the National Academies. It is permitted only in designated outdoor areas.

SECTION LEADERSHIP

Section Chairs

Note: Numbers following Section Chairs' names denote primary and secondary NAE section affiliations. Terms end June 30 of year shown.



Section 1: Aerospace Engineering
Robert L. Crippen (1)
(Retired President
Thiokol Propulsion)
(2019)



Section 7: Electronics, Communication & Information Systems Engineering
Joe C. Campbell (7)
Professor
Electrical/Computer Engineering Department
University of Virginia
(2019)



Section 2: Bioengineering
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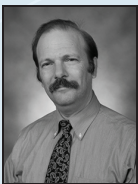
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GUEST PROGRAM

GENERAL INFORMATION

On **Sunday, September 30**, guests are welcome to join NAE members for brunch, followed by the public program—the induction of new members, awards ceremonies, and other presentations—after which they are invited to the reception on the West Lawn.

On the morning of **Monday, October 1**, guests are invited to attend the public forum on **Privacy and Security in the 21st Century – Who Knows and Who Controls?**, or to take a tour of the Kreeger Museum or the Titanic exhibit at the National Geographic Society.

A masterpiece of modernist architecture, the **Kreeger Museum** (kreegermuseum.org) was designed by Philip Johnson in 1963 and completed in 1967. It offers a Monet-filled Great Hall, Terrace Gallery lined with works by Picasso, elegant Sculpture Terrace, and expansive Contemporary Sculpture Garden surrounded by woods. *This docent-led tour will last approximately 1½ hours.*

At the **National Geographic** exhibit ***Titanic: The Untold Story*** (www.nationalgeographic.org/dc/exhibitions/titanic-untold-story), discover the surprising link between a top secret Cold War mission and the 1985 discovery of the Titanic by oceanographer and National Geographic explorer-at-large Robert Ballard. Developed in collaboration with the National Archives and the Ronald Reagan Presidential Library, this exhibition reveals the remarkable—and long-classified—story behind the historic discovery. The exhibit also transports visitors to the height of transatlantic steamship travel, displaying items from the luxurious ocean liner and sharing the stories—many for the first time—of some aboard the ship on its tragic maiden voyage. Among the images and artifacts are the coat worn by Titanic survivor Marion Wright Woolcott, as well as never-before-exhibited ship and expedition memorabilia, including the 8,000-pound crew module from the submersible used to survey the shipwreck. *This program will be approximately 2 hours: a 60-minute video followed by a 45-minute guided tour.*

For both tours: Advance registration is required. Comfortable shoes are recommended for moderate walking and standing. The tours will conclude with a luncheon at the National Press Club.

Also offered is a tour of the **NAS Building** led by Janice Goldblum, National Academies archivist, and Alana Quinn, curator, Cultural Programs of the National Academy of Sciences. The tour will feature and explain the exquisite artistic and architectural details of the Great Hall, the Constitution Avenue foyer and bronze and glass doors, the Members’ Center, Members’ Room, Lecture Room, Board Room, and art exhibitions. Weather permitting, we will also look at the building’s façade.

Please register for this tour in room 120. The program will last approximately 45 minutes and will begin in the West Court at 8:30 am. The forum starts at 9:30 in the Kavli Auditorium and lunch will be provided afterward in the tent on the West Lawn.

Registration Check-In

On Sunday, September 30, and Monday, October 1, meeting registration will be in room 120 at the NAS Building. Please be sure to check in to receive your registration materials.

Registration Hours

Sunday, September 30, 10:00 am–4:00 pm
Monday, October 1, 7:00 am–2:00 pm

Information Desk Hours

Sunday, September 30, 10:30 am–6:30 pm
Monday, October 1, 7:00 am–5:30 pm

NAE Store Hours

Sunday, September 30, 10:00 am–4:00 pm
Monday, October 1, 8:00 am–2:00 pm

IT Help Desk Hours

Sunday, September 30, 10:30 am–5:30 pm
Monday, October 1, 7:30 am–5:30 pm

Shuttle Bus Service

Sunday, September 30

Morning

Departs at 7:15 am
Departs at 10:00 am every 15 minutes, last bus departs at 11:45 am

From	To
------	----

Mayflower	NAS Building
Mayflower	NAS Building

Afternoon

Departs at 2:00 pm every 15 minutes, last bus departs at 2:45 pm

NAS Building	Mayflower
--------------	-----------

Evening

Departs at 5:30 pm, every 15 minutes, last bus departs at 7:30 pm

NAS Building	Mayflower
--------------	-----------

Monday, October 1

Morning

Departs at 6:45 am every 15 minutes, last bus departs at 8:15 am

Mayflower	NAS Building
-----------	--------------

Afternoon

Departs at 1:30 pm and 1:45 pm

NAS Building	Keck Center
--------------	-------------

Evening

Departs at 4:00 pm, every 15 minutes, last bus departs at 6:00 pm
Departs at 4:30 pm, every 15 minutes, last bus departs at 5:30 pm

NAS Building	Mayflower
Keck Center	Mayflower

Guest Tour Bus Service

Monday, October 1

Buses Depart

9:30 am (loads at 9:15 am)
9:30 am (loads at 9:15 am)

From	To
------	----

NAS Building	Kreeger Museum
NAS Building	National Geographic

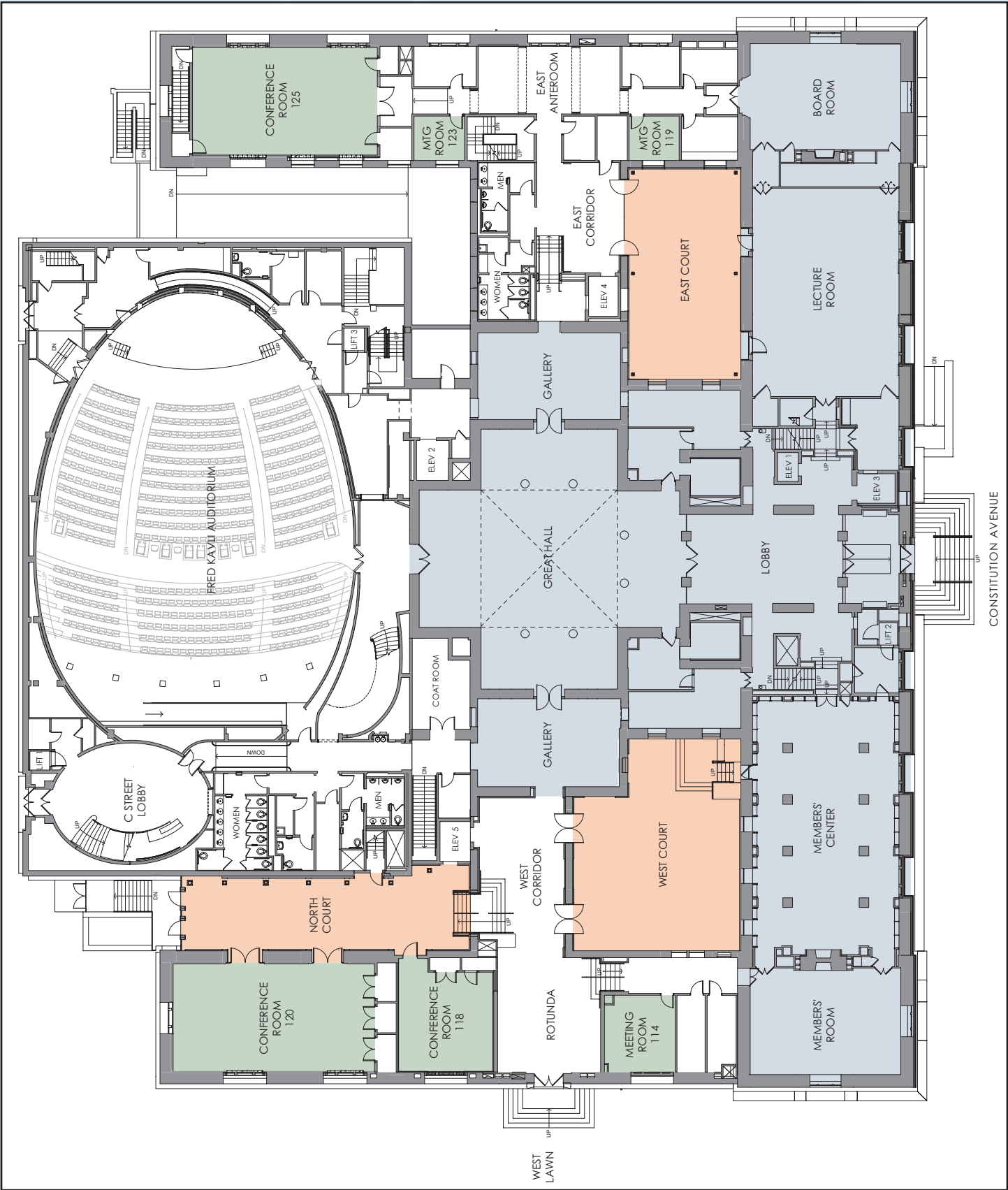
12:00 noon
12:00 noon

Kreeger Museum	National Press Club
National Geographic	National Press Club

2:00 pm

National Press Club	Mayflower Hotel
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NAS BUILDING MAP



AREA MAP



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*Deceased

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The National Academy of Engineering gratefully acknowledges the following members and friends who made charitable contributions to the NAE, and NAE members who supported the Committee on Human Rights, a joint committee of the three academies, during 2017. The collective, private philanthropy of these individuals has a great impact on the NAE and its ability to be a national voice for engineering.

During the 2016 annual meeting, NAE chair Gordon England announced the creation of a \$100,000 Chairman’s Challenge for Section 1 that he personally funded and asked others to join him in creating matching gift challenges for each section by the 2017 annual meeting. Donors who participated in the Chairman’s Challenge are noted with the # symbol.

Fran Ligler, a member of the NAE Council, and her husband George pledged \$100,000 in 2015 to encourage new and increased giving by Section 2 members for five years or until the \$100,000 goal is reached. Members who participated in the Ligler Challenge are noted with the + symbol.

In response to the Chairman’s Challenge, Paul Boulos gave \$25,000 to fund a challenge for Section 4. Donors who participated in the Section 4 Challenge are noted with the ◊ symbol.

In response to the Chairman’s Challenge, Tom Leighton, Gordon Bell, and Bob Sproull gave \$100,000 to fund a challenge for Section 5. Donors who participated in the Section 5 Challenge are noted with the Ω symbol.

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Anonymous (1)

We have made every effort to list donors accurately and according to their wishes. If we have made an error, please accept our apologies and contact the Development Office at 202.334.2431 or giving@nae.edu so we can correct our records.

*Deceased

QUICK REFERENCE GUIDE

Sunday, September 30

All events take place at the NAS Building, 2101 Constitution Avenue NW, unless otherwise noted.

10:00 am–4:00 pm	Registration	NAS 120
10:30 am–11:45 am	Brunch	West Lawn
10:30 am–11:45 am	Tax and Financial Planning Seminar (with brunch)	Members' Room
	PUBLIC PROGRAM	
12:00–2:00 pm	Induction Ceremony for NAE Class of 2018	Kavli Auditorium
2:30–4:00 pm	Awards Program	Kavli Auditorium
4:30–5:30 pm	Plenary Speakers	Kavli Auditorium
5:30–7:00 pm	Reception	West Lawn
6:00–9:00 pm	Golden Bridge Society Reception and Dinner (by invitation)	Offsite

Monday, October 1

7:00 am–2:00 pm	Registration	NAS 120
7:00–8:30 am	Continental Breakfast	West Lawn
7:00–8:30 am	Foreign Secretary's Breakfast (by invitation to the foreign members)	Members' Room
7:00–8:30 am	Home Secretary's Breakfast (by invitation)	Lecture Room
8:30–9:30 am	NAE Business Session	Kavli Auditorium
9:30 am–12:30 pm	Forum: Privacy and Security in the 21st Century – Who Knows and Who Controls?	Kavli Auditorium
12:30–1:30 pm	Lunch	West Lawn
12:45–1:30 pm	Testifying before Congress: A Tutorial (with lunch)	Lecture Room
2:00–5:00 pm	Section Meetings	NAS Building and Keck Center
6:30 pm	Reception	Mayflower Hotel, East Ballroom
7:30 pm–midnight	Dinner and Dancing	Mayflower Hotel, Grand Ballroom

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