

# NEWS

NATIONAL ACADEMY OF SCIENCES  
NATIONAL ACADEMY OF ENGINEERING  
INSTITUTE OF MEDICINE  
NATIONAL RESEARCH COUNCIL

F R O M T H E N A T I O N A L A C A D E M I E S

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National Academy of Engineering

## FOR IMMEDIATE RELEASE

### **NATIONAL ACADEMY OF ENGINEERING ELECTS 69 MEMBERS AND 11 FOREIGN ASSOCIATES**

WASHINGTON – The National Academy of Engineering (NAE) has elected 69 new members and 11 foreign associates, announced NAE President Charles M. Vest today. This brings the total U.S. membership to 2,250 and the number of foreign associates to 211.

Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made outstanding contributions to "engineering research, practice, or education, including, where appropriate, significant contributions to the engineering literature," and to the "pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education."

A list of the newly elected members and foreign associates follows, with their primary affiliations at the time of election and a brief statement of their principal engineering accomplishments.

#### **New Members**

**Adams, Paul R.**, chief operating officer, Pratt & Whitney, East Hartford, Conn. For leadership and innovation for gas turbine engines, especially the Geared Turbofan.

**Agarwal, Anant**, president, edX (online learning initiative of MIT and Harvard University), and professor, electrical engineering and computer science department, Massachusetts Institute of Technology, Cambridge. For contributions to shared-memory and multicore computer architectures.

**Anderson, James M.**, Distinguished University Professor, and professor of pathology, macromolecular science, and biomedical engineering, Case Western Reserve University, Cleveland. For contributions to understanding tissue/biomaterials interactions for designing and testing medical devices.

**Andresen, Peter Louis**, principal scientist, ceramics and metallurgy, Corrosion and Electrochemistry Laboratory, GE Global Research Center, Schenectady, N.Y. For prediction and prevention of stress corrosion cracking in nuclear materials.

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**Beaman Jr., Joseph J.**, Earnest F. Gloyna Regents Chair in Engineering, mechanical engineering department, University of Texas, Austin. For innovation, development, and commercialization of solid freeform fabrication and selective laser sintering.

**Bhavaraju, Murty P.**, senior consultant, PJM Interconnection, Norristown, Pa. For probabilistic reliability evaluation tools for large electric power systems.

**Biegler, Lorenz T.**, Bayer Professor of Chemical Engineering, Carnegie Mellon University, Pittsburgh. For contributions in large-scale nonlinear optimization theory and algorithms for application to process optimization, design, and control.

**Blackmond, Donna G.**, professor of chemistry, Scripps Research Institute, La Jolla, Calif. For kinetic and mechanistic studies of catalytic organic reactions for pharmaceuticals, and for studies of chiral amplification.

**Bonnell, Dawn A.**, Trustees Chair Professor of Materials Science, and director, Nano-Bio Interface Center, University of Pennsylvania, Philadelphia. For development of atomic-resolution surface probes, and for institutional leadership in nanoscience.

**Bowman, Craig T.**, professor of mechanical engineering, Stanford University, Stanford, Calif. For contributions to understanding pollutant formation processes in combustion systems to reduce harmful emissions.

**Burns, Ursula M.**, chairman of the board and chief executive officer, Xerox Corp., Norwalk, Conn. For technical and business leadership of the renaissance of a global services and technology company.

**Chau, Robert S.**, Intel Senior Fellow and director of transistor research and nanotechnology, Technology and Manufacturing Group, Intel Corp., Hillsboro, Ore. For contributions to CMOS transistor technologies for advanced logic products.

**Chew, Weng Cho**, professor, department of electrical and computer engineering, University of Illinois, Urbana. For contributions to large-scale computational electromagnetics of complex structures.

**Crouch, Steven Lee**, Theodore W. Bennett Chair in Mining Engineering and Rock Mechanics, and dean, College of Science and Engineering, University of Minnesota, Minneapolis. For contributions to simulation methodology for the behavior of fractured rock masses.

**Degnan Jr., Thomas F.**, manager, breakthrough and leads generation, ExxonMobil Research and Engineering Co., Annandale, N.J. For contributions to novel catalytic processes for improved lubricant, fuel, and petrochemical production.

**Deierlein, Gregory G.**, professor, department of civil and environmental engineering, and John A. Blume Professor in the School of Engineering, Stanford University, Stanford, Calif. For development of advanced structural analysis and design techniques and their implementation in design codes.

**Dill, David L.**, professor, department of computer science, Stanford University, Stanford, Calif. For the development of techniques to verify hardware, software, and electronic voting systems.

**Dornfeld, David A.**, Will C. Hall Family Chair in Engineering, and professor of mechanical engineering, University of California, Berkeley. For contributions to sustainability in advanced manufacturing, sensors, and precision material processing.

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**El Gamal, Abbas**, Hitachi America Professor in the School of Engineering, and professor and chair, department of electrical engineering, Stanford University, Stanford, Calif. For contributions in information theory, information technology, and image sensors.

**Ellis Jr., James O.**, retired president and chief executive officer, Institute of Nuclear Power Operations, Atlanta. For leadership in advancing safe nuclear power plant operations throughout the world.

**Farhat, Charbel H.**, Vivian Hoff Professor of Aircraft Structures, and chairman, department of aeronautics and astronautics, Stanford University, Stanford, Calif. For contributions to computing fluid-structure interactions and their applications in aeronautical, naval, and mechanical engineering.

**Felten, Edward W.**, professor of computer science and public affairs, and director, Center for Information Technology Policy, Princeton University, Princeton, N.J. For contributions to security of computer systems, and for impact on public policy.

**Fossum, Eric R.**, professor of engineering, Dartmouth College, Hanover, N.H. For inventing and developing the CMOS active-pixel image sensor and camera-on-a-chip.

**Frank, Curtis W.**, William M. Keck Sr. Professor of Chemical Engineering, Stanford University, Stanford, Calif. For elucidation of molecular organization in polymers and other soft materials.

**Gadgil, Ashok J.**, director and senior scientist, environmental energy technologies division, Lawrence Berkeley National Laboratory, and Andrew and Virginia Rudd Family Foundation Professor of Safe Water and Sanitation, University of California, Berkeley. For engineering solutions to the problems of potable water and energy in underdeveloped nations.

**Gay, Charles F.**, president, applied solar division, Applied Materials Inc., Santa Clara, Calif. For leadership in the development of the global photovoltaic industry.

**Goodyear, David**, senior vice president and chief bridge engineer for North American operations, T.Y. Lin International Group, Olympia, Wash. For leadership in concrete segmental, cable-stayed, and hybrid bridge design and construction.

**Greiner, Helen**, chief executive officer and founder, CyPhy Works Inc., Danvers, Mass. For leadership in the design, development, and application of practical robots.

**Gustafson, David H.**, professor of industrial and systems engineering and preventive medicine, University of Wisconsin, Madison. For industrial and systems engineering methods to improve the care of aging, lung cancer, severe asthma, and drug addiction patients.

**Hansman Jr., R. John**, T. Wilson Professor of Aeronautics and Astronautics and Engineering Systems, and director, International Center for Air Transportation, Massachusetts Institute of Technology, Cambridge. For development of aviation display and alerting systems for air safety.

**Harari, Eliyahou (Eli)**, co-founder, retired chairman, and chief executive officer, SanDisk Corp., Saratoga, Calif. For technology advances of commercial flash memory systems.

**Heremans, Joseph P.**, Ohio Eminent Scholar, professor of mechanical and aerospace engineering, and professor of physics, Ohio State University, Columbus. For discoveries in thermal energy transfer and conversion to electricity, and for commercial devices employed in automobiles.

**Herlihy, Maurice**, professor of computer science, Brown University, Providence, R.I. For concurrent computing techniques for linearizability, non-blocking data structures, and transactional memory.

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**Horvitz, Eric**, distinguished scientist and managing co-director, Microsoft Research, Redmond, Wash. For computational mechanisms for decision making under uncertainty and with bounded resources.

**Huff, John Rossman**, chairman, Oceaneering International Inc., Houston. For contributions to the development of remotely operated vehicles for deep-water oil and gas operations.

**Kailasam, Ganesh**, research and development vice president and global research and development director, performance materials division, Dow Chemical Co., Freeport, Texas. For development of processes for production of high-performance polymers including polyetherimides.

**Kavazanjian Jr., Edward**, senior sustainability scientist, Global Institute of Sustainability, and professor, School of Sustainable Engineering and the Built Environment, Ira A. Fulton School of Engineering, Arizona State University, Tempe. For geotechnical engineering for municipal solid-waste management, earthquake hazard mitigation, and safety of transportation facilities.

**Kelly III, John E.**, senior vice president and director of IBM Research, IBM Corp., Yorktown Heights, N.Y. For contributions to the U.S. semiconductor industry through technology innovations and strategic leadership.

**Koch, Carl C.**, Kobe Steel Distinguished Professor of Materials Science and Engineering, North Carolina State University, Raleigh. For synthesis of amorphous and nanocrystalline alloys by mechanical attrition.

**Kolb, Charles E.**, president and chief executive officer, Aerodyne Research Inc., Billerica, Mass. For instruments that advanced measurements of air pollution and aerosols.

**Kumar, Vijay**, UPS Foundation Professor, School of Engineering and Applied Sciences, University of Pennsylvania, Philadelphia. For contributions in cooperative robotics, networked vehicles, and unmanned aerial vehicles, and for leadership in robotics research and education.

**Lavernia, Enrique J.**, dean, College of Engineering, and Distinguished Professor of Chemical Engineering and Materials Science, University of California, Davis. For contributions to novel processing of metals and alloys, and for leadership in engineering education.

**Lee, Raphael C.**, Paul S. and Allene T. Russell Professor of Surgery, Medicine, Organismal Biology and Anatomy, University of Chicago, Chicago. For contributions to understanding cell injury associated with trauma including electrical shock and thermal burns.

**Leong, Kam W.**, James B. Duke Professor of Biomedical Engineering, Pratt School of Engineering, Duke University, Durham, N.C. For contributions to engineered drug delivery and non-viral mediated gene delivery.

**Liao, James C.**, Ralph M. Parsons Foundation Chair Professor, department of chemical and biomolecular engineering, University of California, Los Angeles. For advances in metabolic engineering of microorganisms to produce fuels and chemicals.

**Logan, Bruce E.**, Evan Pugh Professor and Kappe Professor of Environmental Engineering, Pennsylvania State University, University Park. For microbial electrochemical technologies for wastewater treatment and sustainable energy generation.

**Luttrell, Gerald H.**, A.T. Massey Coal Company Professor of Mining and Minerals Engineering, Virginia Polytechnic Institute and State University, Blacksburg. For advancing separation technologies for the mineral and coal industries.

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**Merrill, Edward Wilson**, professor emeritus, department of chemical engineering, Massachusetts Institute of Technology, Belmont, Mass. For contributions to biocompatible materials, bio-rheology, and biomedical engineering education.

**Money, Arthur L.**, independent consultant, Alexandria, Va. For engineering developments and technical leadership in support of U.S. national security efforts.

**Montgomery, John A.**, director of research, U.S. Naval Research Laboratory, Washington, D.C. For leading the Navy's electronics-warfare technical authority, and for developing critical operational systems.

**Moura, José M.F.**, University Professor, department of electrical and computer engineering, and director, Information and Communications Technologies Institute, Carnegie Mellon University, Pittsburgh. For contributions to the theory and practice of statistical signal processing.

**Murray, Richard M.**, Thomas E. and Doris Everhart Professor of Control and Dynamical Systems and Bioengineering, California Institute of Technology, Pasadena. For contributions in control theory and networked control systems with applications to aerospace engineering, robotics, and autonomy.

**Northrup, M. Allen**, consultant and adviser, Northrup Consulting Group, San Francisco. For miniaturization and commercialization of gene amplification and immunosensor technology.

**Ortiz, Michael**, Dotty and Dick Hayman Professor of Aeronautics and Mechanical Engineering, California Institute of Technology, Pasadena. For contributions to computational mechanics to advance the underpinnings of solid mechanics.

**Overbye, Thomas J.**, Fox Family Professor in Electrical and Computer Engineering, University of Illinois, Urbana-Champaign. For the integration of visualization and analysis tools for power systems.

**Podmore, Robin**, president, IncSys Inc., Bellevue, Wash. For development of modeling and simulation tools for power system operation.

**Quake, Stephen R.**, Lee Otterson Professor of Bioengineering and Applied Physics, and co-chair, department of bioengineering, Stanford University, Stanford, Calif. For achievements in single-cell analysis and large-scale integration of microfluidic devices.

**Schafrik, Robert E.**, general manager of materials and process engineering, GE Aviation, Cincinnati. For innovation in materials for gas turbine engines.

**Schilling, Jan C.**, advanced products chief engineer, GE Aviation, Cincinnati. For advancing technology for modern turbofan engines.

**Sehgal, Bal Raj**, emeritus professor of nuclear power safety, Royal Institute of Technology, Stockholm, Sweden. For contributions to predicting accident behavior of nuclear reactor systems.

**Shaqfeh, Eric S.G.**, Lester Levi Carter Professor, professor and chair, department of chemical engineering, and professor of mechanical engineering, Stanford University, Stanford, Calif. For contributions to dynamics and rheology of complex fluids, including polymeric liquids, vesicles, and fiber suspensions.

**Sindhu, Pradeep S.**, vice chairman, chief technical officer, and founder, Juniper Networks, Sunnyvale, Calif. For contributions to technology and commercialization of Internet Protocol routing.

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**Singh, Krishna (Kris) P.**, president and chief executive officer, Holtec International, Marlton, N.J. For engineering and business leadership for increased power plant efficiency and improved safety of spent nuclear fuel storage worldwide.

**Thornton, William A.**, corporate consultant, Cives Engineering Corp., Roswell, Ga. For rational methods of designing steel connections, and for leadership in steel building design.

**Tillerson, Rex W.**, chairman and chief executive officer, ExxonMobil Corp., Irving, Texas. For engineering leadership in the production of hydrocarbons in remote and hostile environments.

**Tracy, John J.**, chief technology officer and senior vice president of engineering, operations and technology, Boeing Co., Chicago. For leadership in advanced composites design and manufacturing technology for air and space vehicles.

**Wood, Sharon L.**, Robert L. Parker Sr. Centennial Professor and chair, department of civil, architectural, and environmental engineering, University of Texas, Austin. For design of reinforced concrete structures and associated seismic instrumentation for extreme loadings and environments.

**Xie, Ken**, founder, president, and chief executive officer, Fortinet Inc., Sunnyvale, Calif. For contributions to cybersecurity, including network security systems and services.

**Zerhouni, Elias**, president, global research and development, Sanofi, Pasadena, Md. For noninvasive MRI methods for complex tissues, and for national leadership in translational medical research.

#### New Foreign Associates

**Cherry, John A.**, adjunct professor in the School of Engineering, and director, University Consortium for Field-Focused Groundwater Contamination Research, University of Guelph, Ontario, Canada. For contributions to understanding contaminant migration and development of engineered systems for groundwater remediation.

**Friend, Richard Henry**, Cavandish Professor of Physics, University of Cambridge, Cambridge, U.K. For contributions to science, engineering, and commercialization of organic polymer semiconductor devices.

**Hibbitt, H. David**, founder and retired chairman, ABAQUS Inc. (now known as Dassault Systèmes Simulia Corp.), Bristol, R.I. For creation and development of the ABAQUS finite element code for nonlinear structural analysis and its worldwide dissemination.

**Hölzle, Urs**, Google Fellow and senior vice president for technical infrastructure, Google Inc., Mountain View, Calif. For contributions to the design, operation, and energy efficiency of large-scale data centers.

**Rasmussen, Jens**, emeritus professor, Risø National Laboratory, Roskilde, and Technical University of Copenhagen, Smorum, Denmark. For contributions to the science and engineering of human error and reliability, and for the modeling of human behavior.

**Shamai (Shitz), Shlomo**, William Fondiller Chair in Telecommunications, department of electrical engineering, Technion-Israel Institute of Technology, Haifa. For contributions to information theory for wireless communication technology.

**Tata, Ratan N.**, chairman emeritus, Tata Group, Mumbai, India. For outstanding contributions to industrial development in India and the world.

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**Topsøe, Henrik**, executive vice president and chief scientific officer, Haldor Topsøe A/S, Lyngby, Denmark. For development of hydrodesulfurization catalysts and elucidation of their active sites.

**Uhlen, Mathias**, professor of microbiology, department of biotechnology, and director, Science for Life Laboratory, Royal Institute of Technology, Stockholm, Sweden. For invention and commercialization of proteinA chromatography, HT DNA sequencing, and the Human Protein Atlas.

**Xie, KeChang**, vice president, Chinese Academy of Engineering, Beijing. For understanding coal molecular structure and its reactivity, and for leadership in the modern clean coal conversion industry.

**Zhou, Ji**, president, Chinese Academy of Engineering, Beijing. For research contributions in numeric control, computer-aided design, and design optimization.

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