NATIONAL ACADEMY OF ENGINEERING

2021–2022

CALL FOR NOMINATIONS

Charles Stark Draper Prize for Engineering

Fritz J. and Dolores H. Russ Prize

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

Simon Ramo Founders Award

Arthur M. Bueche Award

Gibbs Brothers Medal

J.C. Hunsaker Award in Aeronautical Engineering

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

The National Academy of Engineering . . . Recognizing the Engineers Behind the Achievements

The National Academy of Engineering (NAE) serves the United States government and the engineering community by advising on technology issues that impact society.

Each year the NAE salutes leaders in engineering for their lifetime dedication to their field and their commitment to advancing the human condition through great engineering achievement and/or through innovation in engineering and technology education. The NAE dedicates $1 million annually to recognize these leaders and to bring better understanding of the importance of engineering and engineering education to society.

The NAE presents seven awards for engineering achievement and innovation—the Charles Stark Draper Prize for Engineering, the Fritz J. and Dolores H. Russ Prize, the Bernard M. Gordon Prize for Innovation in Engineering and Technology Education, the Simon Ramo Founders Award, the Arthur M. Bueche Award, the Gibbs Brothers Medal, and the J.C. Hunsaker Award in Aeronautical Engineering.

How to Complete the Online Nomination Submission

Inside this packet you will find information on submitting an online nomination for any of NAE's awards. ***There are no restrictions on who may nominate candidates, but self-nominated entries are not accepted.***

To complete the online nomination, simply follow the Award Guide to select the appropriate award that best suits your nomination. Eligibility information is specific to each award and is printed on the following pages.

In addition to completing the online nomination cover form and additional requested materials, at least three supporting letters must accompany the nomination, as well as the candidate's curriculum vitae of **no more** than two pages per candidate. Though not required, you may also choose to submit the candidate's bibliographical listing and/or a list of patents of no more than two pages.

The nominator is responsible for soliciting supporting letters. Supporting letters may be addressed to the nominator or selection committee chair.

Highly competitive nominations from previous years will be considered again this year. The NAE will notify the original nominator that the nomination will be eligible and request the submission of updated material.

How to Submit an Online Nomination

To submit a nomination, please go online at **www.naeawardsonline.com**. There you will find the links to the NAE awards. To register, click on the appropriate awards link. The system will then prompt you to create a user name and password.

If you have any questions, please contact the NAE Awards Office at (202) 334-1266 or e-mail at awards@nae.edu.

Nominations must be received by April 1, 2021.

For more information on the NAE Awards, go to **www.nae.edu/awards**.

Award Guide

Use this guide to select the best award suited to your nomination.

Charles Stark Draper Prize for Engineering

$500,000 Cash Award

Recognized as one of the world's preeminent awards for engineering achievement, this prize honors an engineer whose accomplishment has significantly impacted society by improving quality of life, providing the ability to live freely and comfortably, and/or permitting access to information. The Draper Prize is awarded biennially and recognizes achievements in all engineering disciplines.

Fritz J. and Dolores H. Russ Prize

$500,000 Cash Award

Awarded biennially, the Russ Prize recognizes a bioengineering achievement in widespread use that improves the human condition. This achievement should help the public better understand and appreciate the contributions of engineers to our health, well-being and quality of life. An auxiliary purpose of the Russ Prize is to encourage collaboration between the engineering and medical/biological disciplines and professions.

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

$500,000 Cash Award

The intent of the Gordon Prize, which is awarded annually, is to recognize new modalities and experiments in education that develop effective engineering leaders. The focus is on innovations such as curricular design, teaching methods, and technology-enabled learning that strengthen students' capabilities and desire to grow into leadership roles.

Simon Ramo Founders Award

This annual award honors an outstanding NAE member or international member who has upheld the ideals and principles of the NAE through professional, educational, and personal achievement and accomplishment.

Arthur M. Bueche Award

The honor of this annual award is bestowed on an engineer who has shown dedication in science and technology, as well as active involvement in determining U.S. science and technology policy, promoting technological development, and contributing to the enhancement of the relationship between industries, government, and universities.

Gibbs Brothers Medal

$20,000 Cash Award

This award is for outstanding contributions in the field of naval architecture and marine engineering. It was established through the Gibbs Brothers Fund by gift of William Francis Gibbs and Frederic H. Gibbs.

J.C. Hunsaker Award in Aeronautical Engineering

$50,000 Cash Award

Established by Professor and Mrs. Jerome C. Hunsacker, this award honors excellence in the field of aeronautical engineering.

Charles Stark Draper Prize for Engineering

In 1989 the National Academy of Engineering established the Charles Stark Draper Prize for Engineering, endowed by The Charles Stark Draper Laboratory, Inc., Cambridge, Mass., to recognize achievement specifically directed to the advancement of society and its ability to sustain a certain quality of life and freedom.

About Charles Stark Draper

The Draper Prize honors Charles Stark "Doc" Draper, the "father of inertial navigation." Charles Stark Draper evolved the theory, invented and developed the technology, and led the effort that brought inertial navigation to operational usage in aircraft, space vehicles, and submarines. Founder of The Charles Stark Draper Laboratory and institute professor at the Massachusetts Institute of Technology (MIT), he stands as a pioneer among aircraft engineers. Draper was elected to membership in the NAE in 1965 and died in 1987.

About the Draper Prize

Presented biennially during National Engineers Week in February, the recipient receives a $500,000 cash award, commemorative medallion, and hand-scribed certificate.

The Draper Prize is awarded for a specific achievement or for a series of achievements in any engineering discipline, and may be awarded to an individual or a group of individuals contributing to the same achievement. *The Draper Prize is not awarded posthumously*. NAE members, international members, and nonmembers worldwide are eligible to receive the Draper Prize.

Draper Prize Selection Criteria

The narrative description of the achievement that accompanies the nomination form and additional materials should provide qualitative and quantitative evidence that the following criteria are met:

- **Benefit:** Describe the success of the achievement or innovation in terms of estimates of the number of people benefited and the extent of this benefit.
- **Novelty:** Describe the demonstrated novelty, originality, and fundamental character of the technical idea or concept underlying the innovation or achievement.
- **Removal of fundamental barriers:** Demonstrate that the innovation or achievement has removed fundamental barriers or constraints to subsequent incremental improvement and refinement, or that it embodies wholly new scientific or engineering principles.
- **Technical ramifications and application:** Describe the demonstrated richness of the technical ramifications of the new concept or invention, and its applicability in different areas of application far removed from each other.
- **Follow-through:** Describe the extent of follow-through on the part of the originating individual or team. Excellence in design, execution and management of the innovation, and commercialization or "operationalization" of a new idea should be demonstrated, in addition to the ingenuity and novelty of the original technical conception of "proof of principle."
- **Economic impact:** Document the economic impact of the innovation or achievement. Economic impact would include estimates of gross revenues generated by a new product or process, cost savings made possible by a new process, reductions in environmental impact, or benefits to health and safety in the workplace or of consumers.

Online Nomination Materials

The following information constitutes a complete nomination:

- A completed online nomination form.
- A narrative description of the achievement that addresses the selection criteria and each candidate(s)'s contribution. **Each criterion should contain 750 words or less.**
- The candidate's curriculum vitae (no more than 2 pages per candidate).
- A selected bibliography of publications relevant to the innovation (no more than 2 pages)—optional.
- At least 3 and not more than 6 supporting letters.

To submit a nomination, please go online at **www.naeawardsonline.com/DRAPER/**.

Charles Stark Draper Prize for Engineering

Previous Recipients and Achievements

1989: Jack S. Kilby and Robert N. Noyce—monolithic integrated circuit.

1991: Sir Frank Whittle and Hans J. P. von Ohain—turbojet engine.

1993: John Backus—FORTRAN, the first widely used, general purpose, high-level computer language.

1995: John R. Pierce and Harold A. Rosen—communication satellite technology.

1997: Vladimir Haensel—chemical engineering process of platforming.

1999: Charles K. Kao, Robert D. Maurer, and John B. MacChesney—fiber optics.

2001: Vinton G. Cerf, Robert E. Kahn, Leonard Kleinrock, and Lawrence G. Roberts—the foundations of the Internet.

2002: Robert Langer—biocompatible polymer technologies that control the release of medicine over time.

2003: Ivan A. Getting and Bradford W. Parkinson—Global Positioning System (GPS).

2004: Alan C. Kay, Butler W. Lampson, Robert W. Taylor, and Charles P. Thacker—the first practical networked personal computers.

2005: Minoru S. "Sam" Araki, Francis J. Madden, Edward A. Miller, James W. Plummer, Don H. Schoessler—for the design, development, and operation of Corona, the first space-based Earth observation system.

2006: Willard S. Boyle and George E. Smith—for the invention of the Charge-Coupled Device, a light-sensitive component at the heart of digital cameras and other widely used imaging technologies.

2007: Timothy J. Berners-Lee—for developing the World Wide Web.

2008: Rudolf Kalman—for the development and dissemination of the optimal digital technique (known as the Kalman Filter) that is pervasively used to control a vast array of consumer, health, commercial, and defense products.

2009: Robert H. Dennard—for his invention and contributions to the development of the Dynamic Random Access Memory (DRAM), used universally in computers and other data processing and communication systems.

2011: Frances H. Arnold and Willem P. C. Stemmer—for directed evolution, a method used worldwide for engineering novel enzymes and biocatalytic processes for pharmaceutical and chemical products.

2012: George H. Heilmeier, Wolfgang Helfrich, Martin Schadt and T. Peter Brody—for the engineering development of the Liquid Crystal Display (LCD) utilized in billions of consumer and professional devices.

2013: Martin Cooper, Joel S. Engel, Richard H. Frenkiel, Thomas Haug, and Yoshihisa Okumura—for their pioneering contributions to the world's first cellular telephone networks, systems, and standards.

2014: John B. Goodenough, Yoshio Nishi, Rachid Yazami, and Akira Yoshino—for engineering the rechargeable lithium-ion battery that enables compact, lightweight mobile devices.

2015: Nick Holonyak, Jr., M. George Craford, Russell D. Dupuis, Isamu Akasaki, and Shuji Nakamura—for the invention, development, and commercialization of materials and processes for light-emitting diodes (LEDs).

2016: Andrew J. Viterbi—for development of the Viterbi algorithm, its transformational impact on digital wireless communications, and its significant applications in speech recognition and synthesis and in bioinformatics.

2018: Bjarne Stroustrup—for conceptualizing and developing the C++ programming language.

2020: Jean Fréchet and C. Grant Willson—for the invention, development, and commercialization of chemically amplified materials for micro- and nanofabrication, enabling the extreme miniaturization of microelectronic devices.

Fritz J. and Dolores H. Russ Prize

The National Academy of Engineering established the Fritz J. and Dolores H. Russ Prize in 1999 to recognize an outstanding bioengineering achievement in widespread use that improves the human condition. This achievement should help the public better understand and appreciate the contributions of engineers to our health, well-being and quality of life. An auxiliary purpose of the Russ Prize, which was endowed by the Russes through Ohio University in Athens, Ohio, is to encourage collaboration between the engineering and medical/biological disciplines and professions.

Examples include widely-recognized groundbreaking achievements, innovations, new technologies, and/or product development in such areas as biomedical instrumentation, separation, and control systems; diagnostic technologies; applied genetics engineering; pharmaceutical processing; prosthetic technologies; biomolecular engineering; and applied physiological systems.

About Fritz J. and Dolores H. Russ

Fritz J. and Dolores H. Russ committed a lifetime to the advancement of engineering. They founded one of Ohio's leading engineering businesses, Systems Research Laboratories, and their generosity led to the development of state-of-the-art engineering facilities at such educational institutions as Ohio University, Athens, and Wright State University, Dayton, Ohio. Fritz J. Russ died in 2004 and Dolores H. Russ died in 2008.

About the Russ Prize

Presented biennially during National Engineers Week in February, the recipient receives a $500,000 cash award, commemorative medallion, and hand-scribed certificate.

The Russ Prize is awarded for a specific achievement or for a series of achievements in bioengineering, and may be awarded to an individual or a group of individuals contributing to the same achievement(s). *The Russ Prize is not awarded posthumously.* Recipients of the Charles Stark Draper Prize for Engineering are not eligible for the Russ Prize. NAE members and non-members worldwide are eligible to receive the Russ Prize.

Russ Prize Selection Criteria

The narrative description of the achievement should provide qualitative and quantitative evidence that the following criteria are met:

- **Benefit:** Describe the nature, extent and success of the achievement or innovation in improving the health, well-being, and quality of life of individuals, and document the number and distribution of people actually benefiting.
- **Novelty:** Describe the novelty, originality, and fundamental character of the technical idea or concept underlying the achievement or innovation.
- **Removal of fundamental barriers:** Demonstrate that the achievement or innovation has removed fundamental barriers or constraints to subsequent incremental improvement and refinement, or that it embodies wholly new scientific principles.
- **Technical ramifications and application:** Describe the demonstrated richness of the technical ramifications of the new achievement or innovation, and its applicability in many different areas far removed from each other.
- **Follow-through:** Describe the extent of follow-through on the part of the originating individual or team. Excellence in design, execution and management of the achievement or innovation, and commercialization or "operationalization" should be demonstrated, in addition to the ingenuity and novelty of the original technical conception of "proof of principle."
- **Economic impact:** Document the economic impact, actual or potential, of the achievement or innovation. Economic impact would include gross revenues generated by a new product or process, cost savings made possible by a new process, reductions in environmental impact, or benefits to health and safety in the workplace or of consumers.
- **Public understanding:** Describe how recognizing the achievement or innovation with the Russ Prize will help increase the public understanding of the contributions that engineers make to improve the human condition.
- **Teamwork:** Describe how recognizing the achievement or innovation with the Russ Prize will encourage the engineering and medical/biological disciplines to work more closely together.

Online Nomination Materials

The following information constitutes a complete nomination:

- A completed online nomination form.
- A narrative description of the achievement that addresses the selection criteria and each candidate(s)'s contribution. **Each criterion should contain 750 words or less.**
- The candidate's curriculum vitae (no more than 2 pages per candidate.
- A selected bibliography of publications relevant to the innovation (no more than 2 pages)—optional.
- At least 3 and not more than 6 supporting letters.

To submit a nomination, please go online at **www.naeawardsonline.com/RUSS/**.

Fritz J. and Dolores H. Russ Prize

Previous Recipients and Achievements

2001: Earl E. Bakken and Wilson Greatbatch—the implantable cardiac pacemaker.

2003: Willem J. Kolff—artificial organs, beginning with the kidney.

2005: Leland C. Clark, Jr.—bioengineering membrane-based sensors.

2007: Yuan-Cheng "Bert" Fung—for the characterization and modeling of human tissue mechanics and function leading to prevention and mitigation of trauma.

2009: Elmer L. Gaden—for pioneering the engineering and commercialization of biological systems for large-scale manufacturing of antibiotics and other drugs.

2011: Leroy E. Hood—for automating DNA sequencing that revolutionized biomedicine and forensic science.

2013: Rangaswamy Srinivasan, James J. Wynne, and Samuel E. Blum—for the development of laser ablative photodecomposition, enabling LASIK and PRK eye surgery.

2015: Graeme M. Clark, Erwin Hochmair, Ingeborg J. Hochmair-Desoyer, Michael M. Merzenich, and Blake S. Wilson—for engineering cochlear implants that enable the deaf to hear.

2017: Adolf F. Fercher, James G. Fujimoto, Christoph K. Hitzenberger, David Huang, and Eric A. Swanson—for optical coherence tomography, leveraging creative engineering to invent imaging technology essential for preventing blindness and treating vascular and other diseases.

2019: Julio C. Palmaz, Leonard Pinchuk, Richard A. Schatz, John B. Simpson, and Paul G. Yock—for innovations in medical devices that enable minimally invasive angioplasty treatment of advanced coronary artery disease.

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

Inaugurated in 2001 by the National Academy of Engineering (NAE), the intent of the Gordon Prize is to recognize new modalities and experiments in education that develop effective engineering leaders. The focus is on innovations such as curricular design, teaching methods, and technology-enabled learning that strengthen students' capabilities and desire to grow into leadership roles.

About Bernard Gordon

Considered a pioneer for his contributions in analog-to-digital conversion, tomography, and medical and other high-precision instrumentation, Bernard Gordon is chairman of NeuroLogica Corporation, Danvers, Massachusetts. He is also founder and chairman of the board of Analogic Corporation. Prior to Analogic, Mr. Gordon served as president and co-founder of Epsco, Incorporated, and president of Gordon Engineering. Mr. Gordon has more than 200 worldwide patents on record. In 1986, he received the National Medal of Technology, and in 1991, he was elected a member of the NAE. Bernard Gordon and his wife, Sophia, reside in Manchester, Massachusetts.

About the Gordon Prize

Presented annually at the winning institution, the Gordon Prize carries a cash award of $500,000, half awarded to the recipient as a prize and the remainder granted to the recipient's institution to support the continued development, refinement, and dissemination of the recognized innovation. The recipient also receives a commemorative medallion and hand-scribed certificate.

The recipient will present a public lecture during the NAE's Annual Meeting in fall following the presentation of the prize. Within one year after the receipt of the prize, the recipient will submit a report to the NAE concerning use of the grant portion of the prize.

The intent of the donor, Bernard Gordon, in endowing this prize was to enhance U.S engineering leadership, to foster the development of engineering leaders through innovative educational programs developed by U.S. institutions of learning in the U.S. (i.e., not an international satellite facility) and to increase U.S economic competitiveness. Accordingly, prize recipients must be US citizens or permanent residents who are currently and have been substantially engaged in the nominated engineering and scholastic work in institutions in the United States and the institution where the innovation was developed and which shares the prize with the innovators must be a U.S. institution located in the U.S. Nomination from international persons or organizations are welcome, but must be for U.S. innovators and institutions. NAE members and nonmembers are eligible.* The prize is awarded only to living persons.

Gordon Prize Selection Criteria

Nominators are encouraged to be explicit when writing their description of the nominated engineering education program teaching innovation by focusing on how it specifically promotes engineering leaders and leadership skills through curricula and/or individual projects. ***Each criterion should contain 750 words or less.***

The narrative description of the teaching innovation and additional materials should provide qualitative and quantitative evidence that the following criteria are met:

- **Educational paradigm** for building future engineering leaders: What is unique about this innovation? What sets it apart from other educational programs? How does it advance the process of developing engineering leadership skills and attitudes? Consider communication skills, teamwork, hands-on experience, innovative capacity, inventiveness and drive, interdisciplinary focus, and the ability to access, share, and interpret large volumes of information?
- **Paradigm execution:** Describe its quality and impact on the home institution: Describe demonstrated effects on students (e.g., active engagement in elective student design opportunities, student retention in the engineering degree program, leadership exhibited in the program, proportion of students who pursue advanced engineering education, proportion of students who pursue careers in industry), student evaluations, formal and informal assessments, results of fund-raising and student enrollment efforts, the extent of diffusion in the home institution, and peer recognition of the paradigm, its uniqueness, and its excellence of execution.
- **Transferability and diffusion** of the innovation to other institutions: Describe the nature and extent of adaptation or diffusion at other institutions.
- **Success in producing engineering leaders:** Describe demonstrated success in producing engineering leaders; identify individuals who have benefited from the innovation, and include their past and present positions. (Note that for new programs it takes several years after the first graduating class to generate evidence for this criterion.)
- **Use of the prize:** Describe the potential of the nominee's institution to (1) use half of the prize to enhance the design or execution of their educational paradigm, and (2) share the ideas and experience with other academic institutions.

Online Nomination Materials

The following information constitutes a complete nomination:

1. A completed online nomination form.
2. A narrative description of the teaching innovation that addresses the selection criteria.
3. Current curriculum of the nominated engineering education program, with an emphasis on courses that provide leadership skills training (no more than 5 pages).
4. The candidate's curriculum vitae up to 2 pages per candidate.
5. At least 3 and not more than 6 supporting letters (no more than one-third of which may be from current and/or previous students and/or colleagues at the institution where the innovation was developed).
6. Optional: Selected bibliography of publications relevant to the achievement or education innovation (no more than 2 pages).

To submit a nomination, please go online at **www.naeawardsonline.com/GORDON/**.

Previous Recipients and Innovations

2002: Eli Fromm—the Drexel University E[4] Project and the Gateway Engineering Education Coalition.

2004: Frank S. Barnes—the Interdisciplinary Telecommunications Program (ITP) at the University of Colorado, Boulder.

2005: Edward J. Coyle, Leah H. Jamieson, and William C. Oakes—the Engineering Projects in Community Service (EPICS) program, Purdue University, IN.

2006: Jens E. Jorgensen, John S. Lamancusa, Lueny Morell, Allen L. Soyster, and Jose Zayas-Castro—for creating the Learning Factory at Pennsylvania State University.

2007: Harold S. Goldberg, Jerome E. Levy and Arthur W. Winston—for the development of a multi-disciplinary graduate program for engineering professionals at Tufts University.

2008: Jacquelyn F. Sullivan and Lawrence E. Carlson—the Integrated Teaching and Learning Program at the University of Colorado, Boulder.

2009: Thomas H. Byers and Tina L. Seelig—the Stanford Technology Ventures Program at Stanford University.

2011: Edward F. Crawley—the CDIO (Create-Design-Implement-Operate) Initiative, Massachusetts Institute of Technology.

2012: Clive L. Dym, M. Mack Gilkeson, and J. Richard Phillips—Harvey Mudd College Engineering Program.

2013: Richard K. Miller, David V. Kerns Jr., and Sherra Kerns—for guiding the creation of Olin College and its student-centered approach to developing effective engineering leaders.

2014: John P. Collier, Robert J. Graves, Joseph J. Helble, and Charles E. Hutchinson—for creating an integrated program in engineering innovation from undergraduate through doctorate to prepare students for engineering leadership—Thayer School of Engineering at Dartmouth.

2015: Simon Pitts and Michael B. Silevitch for developing an innovative method to provide graduate engineers with the necessary personal skills to become effective engineering leaders—Northeastern University.

2016: Diran Apelian, Arthur C. Heinricher, Richard F. Vaz, and Kristin K. Wobbe for a project-based engineering curriculum developing leadership, innovative problem-solving, interdisciplinary collaboration, and global competencies—Worcester Polytechnic Institute.

2017: Julio M. Ottino for an educational paradigm that merges analytical, rational left-brain skills with creative, expansive right-brain skills to develop engineering leaders—Northwestern University.

2018: Paul G. Yock for the development and global dissemination of Biodesign, a biomedical technology program creating leaders and innovations that benefit patients—Stanford University.

2019: Paul J. Benkeser, Joseph M. Le Doux, and Wendy C. Newstetter for fusing problem-driven engineering education with learning science principles to create a pioneering program that develops leaders in biomedical engineering—Georgia Institute of Technology and Emory University.

2020: David M. Kelley for formalizing the principles and curriculum of "design thinking" to develop innovative engineering leaders with empathy and creative confidence to generate high-impact solutions—Stanford University.

2021: Official announcement will be made in January 2021. Visit **www.nae.edu/awards** for more information.

Simon Ramo Founders Award

The NAE's oldest award, the Simon Ramo Founders Award was established in 1965 to honor an outstanding NAE member or international member who has upheld the ideals and principles of the NAE through professional, educational, and personal accomplishment.

On May 7, 2013, his 100th birthday, the award was renamed after Simon Ramo, the only surviving founding member of the NAE. Ramo was a member of a committee of 25 that in 1964 advocated for establishing the National Academy of Engineering, which operates under the congressional charter that governs the National Academy of Sciences.

About Simon Ramo

Simon "Si" Ramo was an American physicist, engineer, and business leader. He led development of microwave and missile technology and was sometimes known as the father of the intercontinental ballistic missile. He was partly responsible for the creation of two Fortune 500 companies of the 1970s; Ramo-Wooldridge (TRW after 1958) and Bunker-Ramo (now part of Honeywell). Ramo passed away on June 27, 2016.

About the Simon Ramo Founders Award

Presented annually during the NAE Annual Meeting in the fall, the recipient receives a commemorative medal and a hand-scribed certificate. Any living NAE member or international member is eligible.

Simon Ramo Founders Award Selection Criteria

Demonstrated outstanding professional, educational and personal achievement and accomplishment to the benefit of the people of the United States.

Online Nomination Materials

The following information constitutes a complete nomination:

- A completed nomination cover form.
- A narrative description of the achievement that addresses the selection criteria.
- The candidate's curriculum vitae (no more than 2 pages per candidate).
- A selected bibliography of publications relevant to the innovation (no more than 2 pages)—optional.
- At least 3 and not more than 6 supporting letters.

To submit a nomination, please go online at **www.naeawardsonline.com/FOUNDERS/**.

Previous Recipients

1966: Vannevar Bush
1967: James Smith McDonnell
1968: Vladimir K. Zworykin
1969: Harry Nyquist
1970: Charles S. Draper
1971: Clarence L. Johnson
1972: Edwin H. Land
1973: Warren K. Lewis
1974: J. Erik Jonsson
1975: James B. Fisk
1976: Manson Benedict
1977: John R. Pierce
1978: George M. Low
1979: David Packard
1980: Hoyt C. Hottel
1981: Jacob P. Den Hartog
1982: Kenneth H. Olsen
1983: Harold E. Edgerton
1984: John Bardeen
1985: Willis M. Hawkins
1986: John R.Whinnery
1987: Arnold O. Beckman
1988: Gordon E. Moore
1989: John S. Foster
1990: Neal R. Amundson
1991: George W. Housner
1992: George H. Heilmeier
1993: William R. Hewlett
1994: Ralph Landau
1995: Ernst R. G. Eckert
1996: John W. Morris
1997: Mario Salvadori
1998: Yuan-Cheng B. Fung
1999: Stephen D. Bechtel, Jr.
2000: Charles H. Townes
2001: Chang-Lin Tien
2002: Stuart W. Churchill
2003: Carver A. Mead
2004: Eli Ruckenstein
2005: C. Dan Mote, Jr.
2006: Shu Chien
2007: Stanford (Sol) Penner
2008: Robert M. Nerem
2009: John R. Casani
2010: Robert Langer
2011: David Atlas
2012: Nicholas A. Peppas
2013: Albert D. Wheelon
2014: Robert A. Brown
2015: Linda P.B. Katehi
2016: Ruzena K. Bajcsy
2017: John E. Hopcroft
2018: Thomas Kailath
2019: Cato T. Laurencin
2020: Frances S. Ligler

Arthur M. Bueche Award

The National Academy of Engineering established the Arthur M. Bueche Award in 1982 to recognize statesmanship in science and technology, as well as active involvement in determining US science and technology policy, promoting technological development, and contributing to the enhancement of the relationship between industries, government, and universities.

About Arthur M. Bueche

Arthur M. Bueche (1920–1981) was senior vice president for corporate technology at General Electric and an advocate for the advancement of technology. He was elected to the NAE in 1974 and served a term on the NAE council.

About the Bueche Award

Presented annually during the NAE Annual Meeting in the fall, the recipient receives a commemorative medal and a hand-scribed certificate. NAE members and non-members are eligible to receive the Bueche Award. *The Bueche Award is not awarded posthumously.*

Bueche Award Selection Criteria

Demonstrated statesmanship in science and technology, as well as active involvement in determining US science and technology policy, promoting technological development, and contributing to the enhancement of the relationship between industries, government, and universities.

Nomination Materials

The following information constitutes a complete nomination:

- A completed nomination cover form.
- A narrative description of the achievement that addresses the selection criteria.
- The candidate's curriculum vitae (no more than two (2) pages per candidate).
- A selected bibliography of publications relevant to the innovation (no more than two (2) pages)—optional.
- At least three (3) and not more than six (6) supporting letters.

To submit a nomination, please go online at **www.naeawardsonline.com/BUECHE/**.

Previous Recipients

1983: Simon Ramo
1984: Edward E. David, Jr.
1985: Jerome B.Wiesner
1986: W. O. Baker
1987: Lewis M. Branscomb
1988: Dale R. Corson
1989: James C. Fletcher
1990: Solomon J. Buchsbaum
1991: Norman R. Augustine
1992: Ruben F. Mettler
1993: Ralph E. Gomory
1994: Robert C. Seamans, Jr.
1995: Roland W. Schmitt
1996: William J. Perry
1997: Erich Bloch
1998: John H. Gibbons
1999: H. Guyford Stever
2000: Charles M. Vest
2001: Ian M. Ross
2002: No recipient
2003: Robert A. Frosch
2004: John B. Slaughter
2005: Leo Young
2006: Chauncey Starr
2007: Jordan J. Baruch
2008: G. Wayne Clough
2009: Sheila E. Widnall
2010: Anita K. Jones
2011: Charles Elachi
2012: James J. Duderstadt
2013: John E. Kelly III
2014: Siegfried S. Hecker
2015: William F. Banholzer
2016: Henry T. Yang
2017: Louis J. Lanzerotti
2018: Venkatesh Narayanamurti
2019: Roderic Ivan Pettigrew
2020: Arden L. Bement, Jr.

Gibbs Brothers Medal

The Gibbs Brothers Fund was established at the National Academy of Sciences through a gift from William Francis Gibbs and his brother, Frederic H. Gibbs. Acting as Trustee for the Gibbs Brothers Foundation, Morgan Guaranty Trust Company conveyed the conditions of the gift to the Academy in an agreement dated March 14, 1963. The endowment fund was established to support a prize that recognizes outstanding contributions in the field of naval architecture and marine engineering.

Amount and Frequency of Presentation

Currently, the Gibbs Brothers Medal is awarded every five years with a vermeil medal and a $20,000 prize.

About William Francis Gibbs (1886-1967)

William Francis Gibbs was elected to the National Academy of Engineering in 1965. He was elected to the National Academy of Sciences in 1949.

Fortune Magazine, April 15, 2012
Gibbs' was the wily and irascible mind behind the SS United States, one of America's greatest engineering feats in league with the space shuttle, the Hoover dam and the interstate highway system. The ship is still the largest ocean liner constructed entirely in the U.S. and the fastest to cross the Atlantic in either direction.
Read more: http://fortune.com/2012/04/15/the-love-affair-of-william-francis-gibbs-fortune-1957/

NAS Biographical Memoirs, 1971
Few men have so wholeheartedly dedicated a lifetime to a single objective or derived so much enjoyment from the great effort devoted to achieving their goals as William Francis Gibbs. … An early interest in ships was undoubtedly stimulated when, as a boy, he had the opportunity to witness a ship launching at the Cramp shipyard in Philadelphia. This interest was confirmed and strengthened by a number of transatlantic crossings he made with his younger brother, Frederic, starting in 1901 with a trip on the White Star Liner Oceanic, the largest transatlantic passenger ship at that time. Later crossings were made on the Celtic and the Lusitania, outstanding ships of their day, and in 1907 on the maiden voyage of the Mauretania, which held the transatlantic speed record for over twenty years.

To submit a nomination, please go online at **www.naeawardsonline.com/GIBBS/.**

Previous Recipients

1965: Frederick H. Todd
1967: Alfred A. H. Kiel
1970: Henry A. Schade
1974: Phillip Eisenberg
1976: John C. Niedermair
1978: Matthew G. Forrest
1988: Leslie A. Harlander
1991: Bruce G. Collipp
1993: Olin J. Stephens II
1995: Owen H. Oakley
1997: William B. Morgan
1999: Justin E. Kerwin
2001: Edward E. Horton
2003: Alfred C. Malchiodi
2006: Donald Liu
2009: Keith W. Tantlinger
2012: Robert G. Keane, Jr.
2017: Jerome H. Milgram

J. C. Hunsaker Award in Aeronautical Engineering

The Hunsaker Fund was established at the National Academy of Sciences in 1964 through a gift of common stock from Professor and Mrs. J. C. Hunsaker. The endowment fund was established to support a prize that recognizes distinguished contributions to aeronautical engineering. The exchange of correspondence between NAS President Seitz and Prof. Hunsaker confirms that Hunsaker intended for the award criteria to be very broad and did not wish to place arbitrary limitations on future committees. However, one topic on which Hunsaker was quite specific was that the award should be given in aeronautical—not aerospace—engineering.

Amount and Frequency of Presentation

Currently, the J. C. Hunsaker Award in Aeronautical Engineering[1] is presented every five years with a $50,000 prize.

About J. C. Hunsaker (1886-1984)

Jerome C. Hunsaker was elected to the National Academy of Engineering in 1967 for his contributions to aircraft design and airstrip construction. He was elected to the National Academy of Sciences in 1935.

New York Times, September 12, 1984
… In a career in aviation engineering and air technology that spanned six decades in the classroom, laboratory and government office, he established himself as one of the leading theorists of flight and aircraft design. In addition to designing the flying boat NC-4, which flew from Newfoundland to Portugal and England in the first trans-Atlantic flight in May 1919, he supervised the design of the dirigible Shenandoah, the first large rigid airship made in the United States, which made its first flight in 1923.
Read more: www.nytimes.com/1984/09/12/obituaries/jerome-c-hunsaker-98-is-dead-aeronautical-engineering- pioneer.html?mcubz=3

NAS Biographical Memoirs, 2000
When Jerome C. Hunsaker died in September 1984 at the age of ninety-eight, his illustrious career had spanned the entire existence of the aerospace industry, from the very beginnings of aeronautics to exploration of the solar system. His colleagues had extended from the Wright Brothers to Charles Stark Draper, and included virtually all of the founders and leaders of aeronautics and astronautics. Beginning with important technical contributions, he soon turned his attention to creating and managing the new institutions needed to deal with the growth of the aeronautics industry. By the early 1930s he was at the pinnacle of the aeronautics industry with leadership roles in academia, government, and industry. In recognition of these achievements, in 1933 he was awarded the prestigious Guggenheim Medal, the fifth such recipient after Orville Wright, Ludwig Prandtl, Fredrick Lanchester, and Juan de la Cuerva. His career continued at this level for nearly three decades.

To submit a nomination, please go online at **www.naeawardsonline.com/HUNSAKER/**.

Previous Recipients

1968: Leroy R. Grumman
1973: Donald W. Douglas, Sr.
1980: James S. McDonnell
1985: Thornton A. Wilson
1990: Robert T. Jones
1995: William R. Sears
2000: Richard T. Whitcomb
2005: Elbert L. Rutan
2010: Norman R. Augustine
2015: Alan R. Mulally
2020: Alan C. Brown

[1]The award was established originally as the "National Academy of Sciences Award in Aeronautical Engineering" following NAS Council policy that does not permit awards to be named for living individuals. A subsequent Council action dated April 23, 2010 revised the award name to reflect the name of the donor.