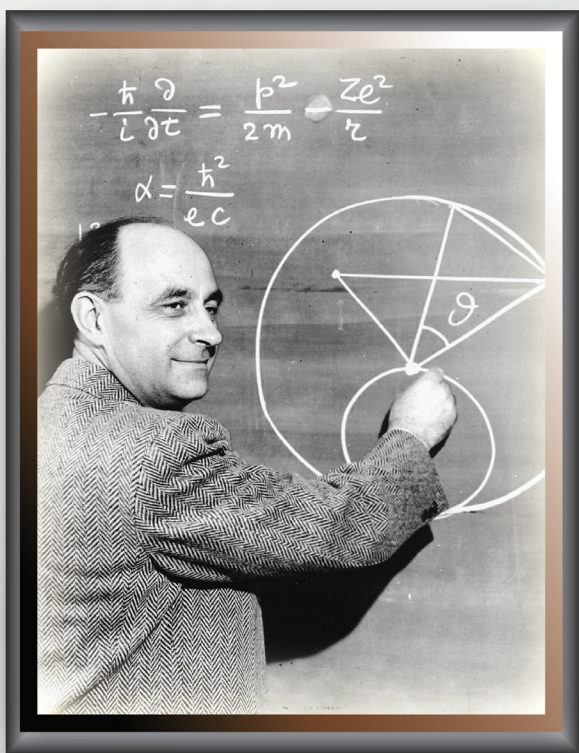


# THE ENRICO FERMI PRESIDENTIAL AWARDS CEREMONY



*An award  
given by the President of the United States  
and the U.S. Department of Energy*

*January 10, 2025  
1000 Independence Avenue SW  
Washington, DC*





**WELCOME**

President Joseph R. Biden Jr.  
and  
Secretary Jennifer M. Granholm

Welcome you to the presentation of the

**2024 ENRICO FERMI PRESIDENTIAL AWARDS**

to

*Héctor D. Abruña*

*Paul Alivisatos*

*John Hopkins Nuckolls*

January 10, 2025

2:30 p.m. ET

at the U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585



## *Recipient*

### CITATION

*“For revolutionizing the fundamental understanding of electroanalytical chemistry and innovating characterization for development of batteries, fuel cells, and energy materials that have led to advancements for the electrical power grid and energy transformation and creation.”*



# *Héctor D. Abruña*



## BACKGROUND

Héctor D. Abruña, the Émile M. Chamot Professor in the Department of Chemistry and Chemical Biology at Cornell University, is an internationally recognized leader in electrochemistry and analytical chemistry. He did his early schooling in his native Puerto Rico and earned a BS in Chemistry from RPI in 1975. He completed his doctoral studies with Royce Murray and Thomas Meyer at UNC Chapel Hill in 1980 and was a postdoctoral research associate with Allen Bard at the University of Texas at Austin. After a brief stay at the University of Puerto Rico, he joined Cornell in 1983 and was Chair of the Department from 2004-2008. Abruña is best known for revolutionizing the fundamental understanding of electrochemical interfaces by pioneering the development of operando techniques with emphasis on X-ray based methods, transmission electron microscopy (TEM) and differential electrochemical mass spectrometry (DEMS). His group pioneered the development of non-precious metal based electrocatalysts for alkaline fuel cells as well as novel materials for batteries, supercapacitors, molecular assemblies and electrochemical sensors. He is a member of the National Academy of Sciences and the American Academy of Arts and Sciences. He has received numerous awards including the 2024 Global Energy Prize, the 2021 American Chemical Society Award in Analytical Chemistry, and the 2017 Gold Medal of the International Society of Electrochemistry. He is the co-author of over 600 publications and has given over 700 invited lectures world-wide. He considers his 65 Ph.D. students and over 70 Post-Doctoral associates as his most important professional achievement.



## *Recipient*

### CITATION

*“For developing the foundational materials and physical chemistry to produce beneficial nanocrystals and polymers with controlled size, shape, connectivity, and topology that underpin energy-efficient technology, optical devices, and medical diagnostic technology.”*

# *Paul Alivisatos*



## BACKGROUND

Paul Alivisatos is president of the University of Chicago and John D. MacArthur Distinguished Service Professor in the Department of Chemistry. President Alivisatos was previously executive vice chancellor and provost of the University of California, Berkeley, where he held numerous positions including director of the Lawrence Berkeley National Laboratory from 2009-2016. Alivisatos received a bachelor's in chemistry from the University of Chicago and his PhD in chemistry from Berkeley. As a preeminent scientist and entrepreneur, his pioneering research in nanomaterials have demonstrated key applications of nanocrystals in biological imaging and renewable energy. For his work, he has been recognized with numerous awards, including the Linus Pauling Medal, the Wolf Prize in Chemistry, the Priestley Medal, and the National Medal of Science. Most recently, he was awarded the 2024 Kavli Prize in Nanoscience.



## *Recipient*

### CITATION

*“For seminal leadership in inertial confinement fusion and high energy density physics, outstanding contributions to national security, and visionary leadership of Lawrence Livermore National Laboratory at the end of the Cold War.”*



# *John Hopkins Nuckolls*



## BACKGROUND

John Hopkin Nuckolls, the seventh director of Lawrence Livermore National Laboratory, took office during a time of unprecedented change during the end of the Cold War and the transition to the post-Cold War world. Nuckolls was born in Chicago, Illinois. He received his B.S. in physics in 1953 from Wheaton College in Illinois, and an M.A. in physics in 1955 from Columbia University in New York. That same year he came to Livermore to work as a staff physicist in Nuclear Weapons Design. In 1975 he became an associate program leader in Laser Fusion, then a division leader in Inertial Fusion, and in 1983 was appointed the associate director for Physics. Nuckolls served as director of the Laboratory from 1988–94, and then as associate director at large, and finally director emeritus. Nuckolls' contributions to national security and the development of fusion energy have been recognized by awards and citations such as the Ernest O. Lawrence Award presented to him in 1969 by the Atomic Energy Commission, the Lifetime Achievement Award in 1996 by Fusion Power Associates, the Secretary of Defense Medal for Outstanding Public Service in 1996, and the Department of Energy Distinguished Associate Award in 1995. He is the author of over 90 publications, including "Post-Cold War Nuclear Dangers: Proliferation and Terrorism," a Science article published February 1995. Nuckolls is a fellow of both the American Physical Society and the American Association for the Advancement of Science.



## THE LIFE OF ENRICO FERMI

Established in 1956, the Enrico Fermi Award aims to perpetuate the memory of this brilliant scientist, honor exceptional researchers and engineers of his kind, and inspire others by his example. The award recognizes outstanding achievements in the development, use, or control of energy (including nuclear, atomic, molecular, and particle interactions and effects). The award is given to people with international reputations and careers marked by continued, outstanding achievements in the field of energy and is not restricted to U.S. citizens.

Born in Rome in 1901, Enrico Fermi was a self-taught scientific child prodigy. By age 17, not only had he acquired what contemporaries considered an advanced graduate-level education in classical physics, but he was also quite proficient at building electric motors. This passion for both the theoretical and the practical characterized Fermi's entire career and distinguished him from most other scientists.

Fermi received his doctorate from the University of Pisa in 1922. From 1923 to 1924, he studied in Göttingen, Germany, with Max Born and in Leiden, the Netherlands, with Paul Ehrenfest. From 1924 to 1926, Fermi lectured in mathematical physics and mechanics at the University of Florence. Based on his already numerous contributions to general theories of relativity, and especially his statistics of particles obeying the exclusion principle, Fermi was awarded the coveted first chair of theoretical physics at the University of Rome, where he taught for 12 years. By 1927, he was already a leading theoretician in the international scientific community.

In the 1930s, Fermi made a series of monumental contributions in physics. He developed the theory of beta decay based on Wolfgang Pauli's hypothesis of the neutrino. As part of his theory, Fermi introduced a new fundamental constant of nature, the Fermi constant, which plays a role analogous to that of an electron charge in electromagnetism. Soon thereafter, other

researchers discovered artificial radioactivity, which provided the experimental activity Fermi pursued for the rest of his career.

Like many other Europeans, Fermi's life was affected by the changing political dynamics of the 1930s. Although he remained silent, Fermi deeply resented the Fascist racial laws instituted in 1938 and their implications for his wife Laura, who was Jewish. When he learned that he was to receive the Nobel Prize for Physics in 1938, he decided to use the occasion to flee. Fermi and his family sailed directly from the ceremony in Stockholm to New York City. His Nobel Prize citation read, "To Professor Enrico Fermi of Rome for his identification of new radioactive elements produced by neutron bombardment and his discovery, made in connection with this work, of nuclear reactions affected by slow neutrons." In his wife's words, "Four years of patient researches; the broken and the unbroken tubes full of beryllium powder and radon; the strenuous races along the hall of the physics building to rush element after element to the Geiger counters; the efforts to understand nuclear processes, and the many tests to prove the theories . . . these had won the Nobel Prize for Enrico."\*

Fermi took a teaching position at Columbia University in 1939. Soon after, Otto Hahn and Fritz Strassmann discovered fission. Fermi and others grasped the significance of secondary neutrons and perhaps a chain reaction, and thus Fermi immediately focused his experiments on causing such a reaction.

When the Manhattan Project was established in 1942, Fermi led the chain reaction and plutonium research. From 1942 to 1944, he worked at the Metallurgical Laboratory of the University of Chicago. There, in a makeshift laboratory under Stagg Field stadium, his team of scientists designed and built the first nuclear reactor. On December 2, 1942, Fermi led the epochal experiment that demonstrated the first self-sustained chain reaction. More than any individual, Enrico Fermi was responsible for the controlled release of nuclear energy. His achievement allowed the United States to produce the atomic bomb that helped end World War II.

Fermi became a U.S. citizen in 1944. From 1944 to 1945, he served as Associate Director of Los Alamos National Laboratory in New Mexico. In 1946, he returned to the University of Chicago as a professor at the

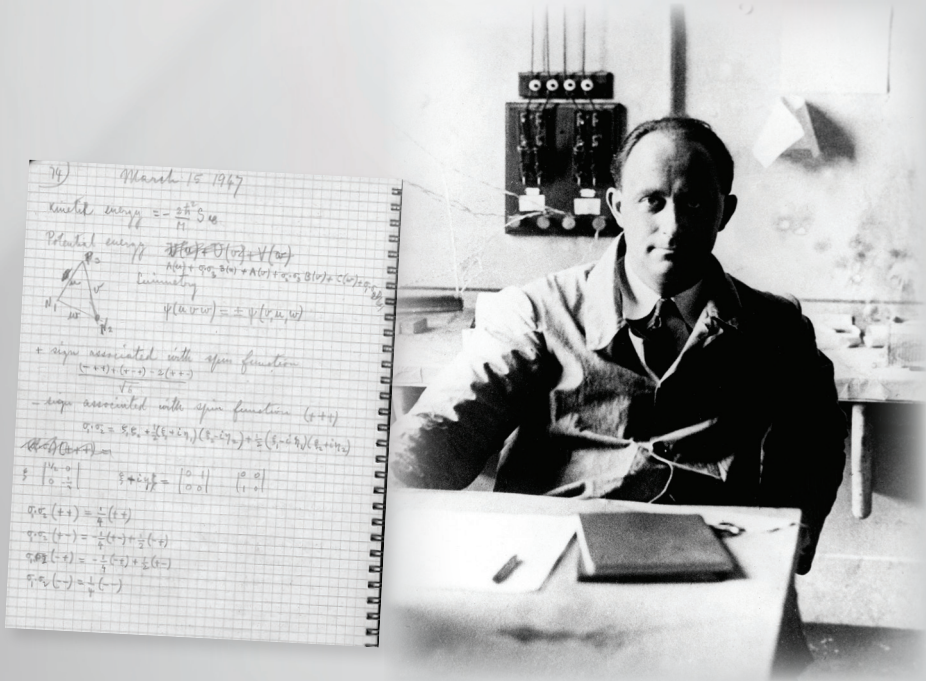


Institute of Nuclear Studies, which now bears his name. Fermi resumed his fundamental research interests in nuclear and elementary particle physics and, beginning in 1950, served as one of the first members of the General Advisory Committee of the Atomic Energy Commission.

On November 16, 1954, President Dwight Eisenhower and the Atomic Energy Commission gave Fermi a special award for his lifetime of accomplishments in physics and, in particular, for the development of atomic energy. Fermi's other research included development of Fermi-Dirac particle statistics, the theory of beta decay, the Thomas-Fermi model of the atom, and a theory of the origin of cosmic rays. Fermi died of cancer on November 28, 1954.

Today—more than 80 years after Fermi harnessed the atom and opened the door to a new scientific realm—nuclear energy provides a significant portion of the world's electrical power and radioactive materials are used in hundreds of medical, agricultural, and industrial applications. These uses range from cancer therapy to food preservation to integrity tests of welds in pipelines and bridges to thickness measurements of coatings applied to paper.

\* Laura Fermi, *Atoms in the Family*, University of Chicago Press, Chicago, 1954, p. 123.







## THE ENRICO FERMI AWARD

As a Presidential award, the Enrico Fermi Award is one of the oldest and most prestigious science and technology honors given by the U.S. Government. It recognizes scientists of international stature for their lifetimes of exceptional achievement in the development, use, control, or production of energy (broadly defined to include the science and technology of nuclear, atomic, molecular, and particle interactions and their effects on mankind and the environment).

On November 16, 1954, President Dwight Eisenhower and the Atomic Energy Commission honored Enrico Fermi with a special award for his lifetime of accomplishments in physics and, in particular, for the development of atomic energy. Twelve days later, the Italian-born naturalized American citizen died of cancer at age 53.

The Enrico Fermi Award was established in 1956 as a memorial to the 1938 Nobel Laureate in physics who initiated the atomic age by achieving the first nuclear chain reaction in December 1942. The first Fermi Award recipients included physicists John von Neumann, Ernest O. Lawrence, Hans Bethe, and Edward Teller.

The award encourages excellence in energy science and technology and demonstrates appreciation to scientists, engineers, and science policy-makers who have given unstintingly over their lifetimes to benefit mankind through energy science and technology. It aims to inspire people of all ages through the examples of Enrico Fermi, whose achievements opened new scientific and technological realms, and the Fermi Award laureates who continue in his tradition.



## ENRICO FERMI PRESIDENTIAL AWARD LAUREATES

- |       |  |       |   |
|-------|--|-------|---|
| 2024: | Héctor D. Abruña<br>Paul Alivisatos<br>John Hopkins Nuckolls | 1995: | Ugo Fano<br>Martin D. Kamen                             |
| 2023: | Darleane C. Hoffman<br>Gabor A. Somorjai                     | 1993: | Freeman J. Dyson<br>Liane B. Russell                    |
| 2014: | Claudio Pellegrini<br>Charles V. Shank                       | 1992: | Harold Brown<br>John S. Foster, Jr.<br>Leon M. Lederman |
| 2013: | Allen J. Bard<br>Andrew Sessler                              | 1990: | George A. Cowan<br>Robley D. Evans                      |
| 2010: | Mildred S. Dresselhaus<br>Burton Richter                     | 1988: | Richard B. Setlow<br>Victor F. Weisskopf                |
| 2009: | John Bannister Goodenough<br>Siegfried S. Hecker             | 1987: | Luis Alvarez<br>Gerald F. Tape                          |
| 2005: | Arthur H. Rosenfeld  | 1986: | Ernest D. Courant<br>M. Stanley Livingston              |
| 2003: | John N. Bahcall<br>Raymond Davis, Jr.<br>Seymour Sack        | 1985: | Norman Rasmussen<br>Marshall Rosenbluth                 |
| 2000: | Sheldon Datz<br>Sidney D. Drell<br>Herbert F. York           | 1984: | Georges Vendryés<br>Robert R. Wilson                    |
| 1998: | Maurice Goldhaber<br>Michael E. Phelps                       | 1983: | Alexander Hollaender<br>John H. Lawrence                |
| 1996: | Mortimer M. Elkind<br>Richard L. Garwin<br>H. Rodney Withers | 1982: | Herbert Anderson<br>Seth Neddermeyer                    |
|       |  | 1981: | W. Bennett Lewis  |



## ENRICO FERMI PRESIDENTIAL AWARD LAUREATES

1980: Rudolf E. Peierls  
Alvin M. Weinberg

1978: Wolfgang K.H. Panofsky  
Harold M. Agnew

1976: William L. Russell

1972: Manson Benedict

1971: Shields Warren  
Stafford L. Warren

1970: Norris E. Bradbury

1969: Walter H. Zinn

1968: John A. Wheeler

1966: Otto Hahn  
Lise Meitner  
Fritz Strassmann

1964: H.G. Rickover

1963: J.R. Oppenheimer

1962: Edward Teller

1961: Hans A. Bethe

1959: Glenn T. Seaborg

1958: Eugene P. Wigner

1957: Ernest O. Lawrence

1956: John von Neumann

THE ENRICO FERMI PRESIDENTIAL AWARDS CEREMONY

