The Ernest Orlando Lawrence Awards

September 22, 2022
United States Department of Energy
1000 Independence Avenue SW
Washington, D.C.

To Join Virtually, Please Visit:
https://science.osti.gov/lawrence/ceremony

An award given
by the U.S. Department of Energy

The medal depicts a portrait surrounded by the inscription: ERNEST·ORLANDO·LAWRENCE·MEMORIAL·AWARD· with the dates MCMI and MCMLVIII.

Welcome

The Honorable Jennifer Granholm,
Secretary of Energy
welcomes you to the presentation of the

Ernest Orlando Lawrence Award

to

Matthew C. Beard
National Renewable Energy Laboratory

Andrew J. Landahl
Sandia National Laboratories and The University of New Mexico

Jie Xiao
Pacific Northwest National Laboratory and University of Washington

Philip C. Schuster
SLAC National Accelerator Laboratory and Stanford University

Daniel B. Sinars
Sandia National Laboratories

Jennifer Pett-Ridge
Lawrence Livermore National Laboratory and University of California, Merced

Rachel A. Segalman
University of California, Santa Barbara

Luis Chacón
Los Alamos National Laboratory

Natalia Toro
SLAC National Accelerator Laboratory and Stanford University

Sofia Quaglioni
Lawrence Livermore National Laboratory

September 22, 2022 1:30 pm
United States Department of Energy
1000 Independence Avenue, SW
Washington, DC

Award

Laureate

Citations

Matthew C. Beard

National Renewable Energy Laboratory

Atomic, Molecular, and Chemical Sciences

For groundbreaking research providing understanding and control of solar photochemical processes, interfacial phenomena, and next-generation photovoltaics, including nanoscale and organic-inorganic hybrid systems.

Jennifer Pett-Ridge

Lawrence Livermore National Laboratory and University of California, Merced

Biological and Environmental Sciences

For pioneering work in quantitative microbial ecology and leadership in developing and applying isotopic tools that help us discover and quantify how changing climate shapes the roles of microorganisms and plants in environmental biogeochemical cycles.

Andrew J. Landahl

Sandia National Laboratories and The University of New Mexico

Computer, Information, and Knowledge Sciences

For groundbreaking contributions to quantum computing, including the invention of transformational quantum error correction protocols and decoding algorithms, for scientific leadership in the development of quantum computing technology and quantum programming languages, and for professional service to the quantum information science community.

Rachel A. Segalman

University of California, Santa Barbara

Condensed Matter and Materials Sciences

For significant fundamental materials science and engineering contributions to self-assembly and structure-property relationships in functional polymer systems, with specific applications to photovoltaic, thermoelectric, and membrane technologies.

Jie Xiao

Pacific Northwest National Laboratory and University of Washington

Energy Science and Innovation

For significant scientific contributions in integrating materials science and electrochemistry across scales to advance both the state of science and the state of technology in emerging electrochemical energy storage systems.

Luis Chacón

Los Alamos National Laboratory

Fusion and Plasma Sciences

For seminal contributions in multiscale algorithms for fluid, kinetic, and hybrid simulation of plasmas, enabling scientific breakthroughs in fast magnetic reconnection and self-organization in magnetic fusion systems, and in reactivity degradation in inertial fusion systems.

Philip C. Schuster

SLAC National Accelerator Laboratory and Stanford University

High Energy Physics

For originating new fields of study with pioneering innovative searches for Dark Sectors using high-intensity particle beams and the invention of Simplified Models for new physics searches at the Large Hadron Collider. (co-awarded with Natalia Toro)

Natalia Toro

SLAC National Accelerator Laboratory and Stanford University

High Energy Physics

For originating new fields of study with pioneering innovative searches for Dark Sectors using high-intensity particle beams and the invention of Simplified Models for new physics searches at the Large Hadron Collider. (co-awarded with Philip C. Schuster)

Daniel B. Sinars
Sandia National Laboratories

National Security and Nonproliferation

For pioneering development of seminal x-ray diagnostics and their innovative application to z-pinch implosions that transformed the experimental capabilities on the Z pulsed power facility and enabled novel, record-breaking platforms supporting our nation's nuclear security.

Sofia Quaglioni
Lawrence Livermore National Laboratory

Nuclear Physics

For seminal contributions unifying the theory of structure and reactions of light nuclei, providing predictive capability critical for understanding inertial fusion and nuclear astrophysics, and for pioneering applications of quantum device simulations for nuclear dynamics.

Atomic, Molecular, and Chemical Sciences

MATTHEW C. BEARD

National Renewable Energy Laboratory

Dr. Matthew C. Beard is a Senior Research Fellow at the National Renewable Energy Laboratory (NREL) and Fellow of the Renewable and Sustainable Energy Institute (RASEI) at the University of Colorado, Boulder. Dr. Beard received his Ph.D. in physical chemistry from Yale University in 2002 working with Charlie Schmuttenmaer on the development of time-resolved THz spectroscopy, a non-contact probe of charge-carrier transport characteristics. He joined NREL as a post-doctoral researcher in 2004 working with Arthur Nozik developing strategies for improving the initial light-to-energy conversion efficiency (primary step) in solar energy conversion. They investigated multiple exciton generation in colloidal semiconductor nanocrystals (or quantum dots [QDs]). Dr. Beard joined NREL as research scientist in 2005 investigating QD arrays, QD solids, and QD solar cells to improve the limiting solar energy conversion efficiencies, supported by the Office of Science at the Department of Energy. Currently, Dr. Beard serves as the Director of the Center for Hybrid Organic Inorganic Semiconductors for Energy (CHOISE), an Energy Frontier Research Center funded by the Office of Science. The center brings together 18 senior researchers across 8 institutions (NREL plus 7 academic universities). CHOISE is learning to control the organic/inorganic interactions in hybrid semiconductors to achieve unprecedented opto-electronic properties. His research interest includes hot-carrier utilization (slowed hot-carrier cooling and multiple exciton generation), nanostructures, and hybrid (organic/inorganic) systems for solar energy transduction, photochemical energy conversion, and the development of ultrafast transient spectroscopies in tracking energy conversion processes.

Biological and Environmental Sciences

Jennifer Pett-Ridge

Lawrence Livermore National Laboratory and University of California, Merced

Dr. Jennifer Pett-Ridge is a senior staff scientist at Lawrence Livermore National Laboratory (LLNL), who uses microbial ecology, isotope tracing/imaging (NanoSIMS), molecular systems biology and biogeochemistry to link identity and function in environmental microbiomes. As the Principal Investigator of LLNL's 'Microbes Persist' Soil Microbiome Scientific Focus Area (SFA) and founder of LLNL's Genomic Science Biofuels SFA, she coordinates multi-disciplinary teams working on plant-microbial interactions for sustainable biofuels and microbiome interactions that underpin soil carbon persistence. She currently leads the Soil Carbon Uptake team for LLNL's Carbon Initiative and National Getting to Net-Zero analysis, a U.S. county-level economy-wide evaluation of carbon dioxide removal. Dr. Pett-Ridge received her undergraduate and master's degrees from Yale University, her Ph.D. from University of California, Berkeley, and completed a postdoc at LLNL. As Group Leader for the LLNL Environmental Isotope Systems group, Dr. Pett-Ridge manages over $35 million in Department of Energy (DOE), National Science Foundation, National Aeronautics and Space Administration, and other funding, and collaborates with a large group of scientists, postdocs, and students at LLNL and beyond. She has published over 120 peer-review articles and is a senior editor for ISME Communications, Soil Biology & Biochemistry, and Microbiology and Molecular Biology Reviews. Dr. Pett-Ridge is an Adjunct Full Professor at University of California, Merced, and recently served on the Executive Council for the American Geophysical Union Biogeosciences Section. Earlier in her career, she was an adjunct professor at the University of Oregon, and a visiting scholar at the University of San Francisco de Quito, Ecuador. She received a DOE Early Career Award in 2014, was the 2019 Geochemical Society Endowed Biogeochemistry Lecturer and Medal recipient, and in 2021 received the DOE Secretary of Energy Achievement Award.

Computer, Information, and Knowledge Sciences

ANDREW J. LANDAHL

Sandia National Laboratories and The University of New Mexico

Dr. Andrew Landahl is a Distinguished R&D Scientist in the Quantum Computer Science department at Sandia National Laboratories, a Research Professor of Physics and Astronomy at the University of New Mexico (UNM), and a Fellow of the American Physical Society. Dr. Landahl came to Sandia in 2009 after serving as a full-time Research Assistant Professor at UNM. Prior to that, he was a Hewlett-Packard Postdoctoral Fellow at the Massachusetts Institute of Technology with extended visits to Cambridge University and Harvard University. He holds Ph.D. and M.S. degrees in Physics from the California Institute of Technology and B.S. degrees in Physics and Mathematics from Virginia Tech. He is also proudly an alumnus of the Thomas Jefferson High School for Science and Technology. Dr. Landahl has developed new methods for quantum error correction and fault-tolerant quantum computing that underpin substantial worldwide quantum computing investments. He led Sandia's Adiabatic Quantum Architectures In Ultracold Systems (AQUARIUS) Laboratory Directed Research and Development (LDRD) Grand Challenge, which built two quantum computers (a trapped-atom and a silicon-donor computer) in three years from scratch. He leads Sandia's Architectures and Algorithms team for the Department of Energy (DOE) Quantum Systems Accelerator, a National Quantum Information Science Research Center, and the Software Stack team for the DOE Quantum Scientific Quantum Computing Testbed (QSCOUT), a project that recently won an R&D 100 award for bringing quantum computing to a wider audience. He is passionate about developing the field of quantum information science (QIS), serving in the chair line of the largest QIS professional society for four years, founding new QIS conferences, and educating others, including members of Congress, the National Academies, and the public, through TEDx talks.

Condensed Matter and Materials Sciences

Rachel A. Segalman

University of California, Santa Barbara

Professor Rachel A. Segalman received her B.S. from the University of Texas at Austin (UT) and Ph.D. from the University of California, Santa Barbara (UCSB). She was a postdoctoral fellow at the Université Louis Pasteur before joining the faculty of University of California, Berkeley, and Lawrence Berkeley National Laboratory (LBL) from 2004-2014. During a portion of this time she also served as the Materials Science Division Director at Lawrence Berkeley National Laboratory. In 2014, she moved to UCSB to be the Kramer Professor of Chemical Engineering and Materials and became Department Chair of Chemical Engineering in 2015. In 2018 she also became the Schlinger Distinguished Chair of Chemical Engineering and the Associate Director of the UT/UCSB/LBL Energy Frontier Research Center: Center for Materials for Water and Energy Systems. She is the co-editor of the Annual Reviews of Chemical and Biomolecular Engineering and an associate editor of ACS Macro Letters. Prof. Segalman's group works on controlling the structure and thermodynamics of functional polymers for energy applications including polymeric ionic liquids and semiconducting and bioinspired polymers. Among other awards, Prof. Segalman received the Journal of Polymer Science Innovation Award, the Dillon Medal from the American Physical Society, the Presidential Early Career Award for Scientists and Engineers, and she is an Alfred P. Sloan Fellow and a Camille Dreyfus Teacher Scholar. She is also a Fellow of the American Physical Society and was elected to the American Academy of Arts and Sciences and the National Academy of Engineering.

Energy Science and Innovation

JIE XIAO

Pacific Northwest National Laboratory and University of Washington

Dr. Jie Xiao is a Laboratory Fellow and Group Leader of the Battery Materials and System Group at Pacific Northwest National Laboratory (PNNL), where she also serves as the Deputy Director of the Department of Energy's Battery500 Consortium led by PNNL. In addition, she is an affiliated Professor of Materials Science and Engineering Department at the University of Washington (UW) and is a PNNL-UW distinguished faculty fellow. Dr. Xiao has been leading research thrusts in both fundamental research and practical applications of energy storage materials and systems. Her work spans materials synthesis and scaleup, electrode architecture and processing, cell design, fabrication and prototyping for vehicle electrification, grid energy storage and other specialized applications. She has published more than 120 peer-reviewed journal papers and has been named a top 1% Clarivate Analytics Highly Cited Researcher annually since 2017. She holds seventeen patents in energy storage; seven of those have been licensed to industry. Dr. Xiao has received several awards, including the Battelle Distinguished Inventor Award, the Electrochemical Society Battery Division Technology Award, the Young Researcher Award from the International Automotive Lithium Battery Association, Materials Today Rising Star Award, a Federal Laboratory Consortium (FLC) Award and two R&D 100 Awards. She obtained her Ph.D. degree in Materials Chemistry from State University of New York Binghamton in 2008.

Fusion and Plasma Sciences

LUIS CHACÓN

Los Alamos National Laboratory

Dr. Luis Chacón is a Fellow of the American Physical Society since 2020, and a Senior Scientist of International Stature in the Theoretical Division at Los Alamos National Laboratory (LANL) since 2012. Dr. Chacón received an M.S. degree in Industrial Engineering from the Polytechnic University of Madrid (UPM) in 1994, M.S. and Ph.D. degrees in Nuclear Engineering from the University of Illinois at Urbana-Champaign in 1998 and 2000, respectively, and a Ph.D. degree from UPM in 2001. He joined the Theoretical Division at LANL as a Director's Postdoctoral Fellow in 2000, becoming a Staff Member in 2002. Dr. Chacón later joined the Fusion Energy Division at Oak Ridge National Laboratory in 2008, returning to LANL in 2012. His research focuses on multiscale algorithm development for fluid and kinetic modeling of plasmas, with applications to basic plasmas, inertial confinement fusion, and magnetic fusion, resulting in 120 publications that have been cited about 4000 times. Dr. Chacón has been an Associate and Executive Editor in the Journal of Computational Physics from 2013-2022 and 2015-2021, respectively, and several times Guest Editor in the SIAM Journal of Scientific Computing since 2016. Dr. Chacón has organized numerous conferences and workshops, including the International Sherwood Fusion Theory Conference (Chair, 2011-12), the Copper Mountain Meeting on Iterative Methods (Scientific Committee member since 2016), the Kinetic Effects in Inertial Confinement Fusion Workshop (co-Chair, 2018), the International Conference of Numerical Simulation of Plasmas (Chair, 2019), and the Joint Institute for Fusion Theory US-Japan Workshop on Multiscale Simulation of Plasmas (U.S. co-Chair, 2019).

HIGH ENERGY PHYSICS

Philip C. Schuster

SLAC National Accelerator Laboratory and Stanford University

Professor Philip Schuster is a particle physicist focused on the theoretical underpinnings of the Standard Model, identifying dark matter and its properties, and new experimental tests of fundamental forces and interactions. He is currently a Professor and Chair of the Particle Physics and Astrophysics faculty at SLAC National Accelerator Laboratory and Stanford University. Prof. Schuster received an S.B. in Physics from the Massachusetts Institute of Technology in 2003, and Ph.D. in Physics from Harvard University in 2007. He was a research associate at SLAC from 2007-2010, joined the faculty at Perimeter Institute in 2010, and moved to SLAC as an Associate Professor with tenure in 2015. During this time, Prof. Schuster developed new methods to characterize data from physics searches at the Large Hadron Collider, models of weak-scale physics and dark matter, new ideas for small-scale accelerator experiments to create and detect dark matter and related particles, and he has recently made novel theoretical inroads exploring aspects of long-range forces and scattering amplitudes. He is a co-spokesperson for A' Experiment (APEX) and a member of the Heavy Photon Search experiment, both carried out at Thomas Jefferson National Accelerator Facility and searching for particles that could mediate dark matter interactions. He is also a founding member and physics coordinator for the Light Dark Matter Experiment (LDMX) designed to produce and detect dark matter using electrons from SLAC's Linac Coherent Light Source-II accelerator. Prof. Schuster was a recipient of the 2015 New Horizons Physics Prize, a 2015 Ontario Early Researcher Award, and a 2012 Natural Sciences and Engineering Research Council Discovery Accelerator Award.

HIGH ENERGY PHYSICS

NATALIA TORO

SLAC National Accelerator Laboratory and Stanford University

Professor Natalia Toro is a Professor of Particle Physics and Astrophysics at SLAC National Accelerator Laboratory and Stanford University. Prior to moving to SLAC in 2015, Prof. Toro was a faculty member at Perimeter Institute for Theoretical Physics, a Member of the School of Natural Sciences at the Institute for Advanced Study, and a Postdoctoral Fellow at Stanford University. She was an undergraduate at the Massachusetts Institute of Technology and completed her Ph.D. in theoretical physics at Harvard University in 2007 under the supervision of Nima Arkani-Hamed. Prof. Toro's research lies at the interface of theory and experiment, with a focus on finding new ways to test and refine our understanding of the laws of nature. She has pioneered the development of searches for weakly coupled new physics and light dark matter using low-energy particle accelerators, leading to the development of the A' Experiment (APEX), Heavy Photon Search (HPS), and (proposed) Light Dark Matter Experiment (LDMX); worked with members of the Compact Muon Solenoid experiment at the Large Hadron Collider to integrate simplified model techniques into their search program; and devised new theories of massless particles, as well as approaches to searching for dark matter using superconducting radio-frequency cavities and macroscopic electromagnetic fields.

National Security and Nonproliferation

Daniel B. Sinars

Sandia National
Laboratories

Dr. Daniel Sinars is the Director for the Pulsed Power Sciences Center, which is best known for conducting research on the world's most powerful pulsed power machine, the 26 MA, 80-TW, 22 MJ "Z" facility. The Z facility is used for a wide range of high energy density physics science, the study of matter and radiation at extreme pressures (>1 million times atmospheric pressure). Dr. Sinars is also the Sandia Executive for the Inertial Confinement Fusion and Science programs of the National Nuclear Security Administration. The Center manages a combined annual budget of more than $150 million and has about 300 employees. The Center also operates several additional facilities, including the multi-kJ, 2-TW Z-Beamlet laser facility adjacent to Z, the STAR gas gun facilities, and a variety of smaller pulsed power machines. Dr. Sinars joined Sandia in 2001 after receiving a Ph.D. in Applied Physics from Cornell University, and a B.S. in Engineering Physics from the University of Oklahoma in 1996. He has made extensive contributions to inertial confinement fusion, high energy density science, and z-pinch physics research, with over 130 refereed journal publications in these fields (26 as first author) and an h-index of 42 (Elsevier Scopus). Dr. Sinar's contributions were recognized in 2007 with an Institute of Electrical and Electronics Engineers (IEEE) Nuclear and Plasma Sciences Society Early Achievement Award, and in 2011 with both a Department of Energy Early Career Research Program Award and the Presidential Early Career Award for Scientists and Engineers (PECASE). He was elected as a Fellow of the American Physical Society in September 2015.

Nuclear Physics

SOFIA QUAGLIONI

Lawrence Livermore National Laboratory

Dr. Sofia Quaglioni is the Group Leader of the Nuclear Data and Theory Group in the Nuclear and Chemical Sciences Division at Lawrence Livermore National Laboratory (LLNL). She received her Ph.D. in Physics from the University of Trento, Italy, and was a postdoctoral fellow at the University of Arizona prior to joining the nuclear theory effort at LLNL. Dr. Quaglioni's research is driven by the desire to arrive at a comprehensive and predictive understanding of how the static and dynamic properties of atomic nuclei emerge from the laws of quantum mechanics and the fundamental strong force among protons and neutrons. Her work has helped lead to the emergence of a new, unified framework—combining first-principle theory and high-performance computing simulations—to explain the structure of both stable nuclei and rare isotopes, and predict the rates of thermonuclear reactions between light nuclei during the Big Bang, in the interior of stars, and in terrestrial fusion experiments. More recently, Dr. Quaglioni has been leading a joint nuclear theory and quantum hardware team, pioneering the application of near-term quantum computing to the simulation of nuclear dynamics. In her various roles at LLNL, she has also contributed to the Stewardship Science Program, through the evaluation of cross sections that directly impact the Department of Energy (DOE) national security and non-proliferation mission. Dr. Quaglioni has served in numerous national panels, including the Nuclear Science Advisory Committee and its Subcommittee on Nuclear Physics and Quantum Information Science. She was the recipient of a DOE Early Career Award and has been recognized with a Fellowship of the American Physical Society.

THE LIFE OF ERNEST ORLANDO LAWRENCE

Ernest Orlando Lawrence's scientific accomplishments and influence on science are unique in his generation and rank among the most outstanding in history. His cyclotron was to nuclear science what Galileo's telescope was to astronomy. A foremost symbol of the rise of indigenous American science in the twentieth century, Lawrence, perhaps more than any other man, brought engineering to the laboratory, to the great benefit of scientific progress. He originated a new pattern of research, of the group type and on the grand scale, which has been emulated the world over. Rarely, if ever, has any person given so many others, in such a small span of years, the opportunity to make careers for themselves in science. Lawrence was a leader in bringing the daring of science to technology, in wedding science to the general welfare, and in integrating science into national policy.

Lawrence was born in Canton, South Dakota on August 8, 1901. He was the son of educated Norwegian immigrants. Lawrence received his B.S. degree from the University of South Dakota and his M.A. in physics from the University of Minnesota. He continued his studies at the University of Chicago for two years, then transferred to Yale, where he received his Ph.D. in 1925. In 1928, Lawrence went to the University of California as an associate professor, and in 1930, at the age of 29, he became the youngest full professor on the Berkeley faculty.

His doctoral thesis was in photoelectricity. Later, he made the most precise determination to that time of the ionization potential of the mercury atom. With J.W. Beams, he devised a method of obtaining time intervals as small as three billionths of a second, and he applied this technique to study the early stages of

electric spark discharge. He originated a new and more precise method for measuring e/m, which was perfected by F.G. Dunnington.

Lawrence had been contemplating the problem of accelerating ions for some time. In 1929, while scanning the literature, he happened upon a sketch in a German publication. Within minutes, he formulated the principles of the cyclotron and the linear accelerator and so set himself upon a course that was to fundamentally influence scientific research and human events. Between the brilliant, simple concept and operating machines lay engineering barriers not previously encountered. Lawrence's willingness to tackle new engineering problems and his success in solving them, as he reached for successively new energy ranges, was a departure in scientific research that is an important part of his contribution. The hard road he chose was recognized when W.D. Coolidge, presenting Lawrence with the National Academy of Sciences' valued Comstock Prize in 1937, said, "Dr. Lawrence envisioned a radically different course ... [which] called for boldness and faith and persistence to a degree rarely matched." By 1936, the scale of research and supporting engineering development was so large that the Radiation Laboratory was created at the University of California. The prototype of the big laboratory had been born.

Lawrence championed interdisciplinary collaboration. He strongly encouraged physicists to work with biologists, and he set up his own radioisotope distribution system, supplying isotopes to hundreds of doctors and numerous institutions in the prewar period. With his brother John, director of the University's medical center, he used the cyclotron to irradiate malignant tissues with neutrons.

In July 1958, Lawrence traveled to Geneva to take part in developing an agreement on means for detecting nuclear weapon tests. In the midst of negotiations, he became ill and was forced to return to Palo Alto, California, where he died on August 27, 1958.

Lawrence received many awards during his lifetime, including the 1939 Nobel Prize in Physics, the Hughes Medal of the Royal Society, the Medal for Merit, the Faraday Medal, the American Cancer Society Medal, the 1957 Enrico Fermi Award, and the first Sylvanus Thayer Award. He was a member of the National Academy of Sciences and the American Philosophical Society and recipient of many honorary degrees and memberships in foreign societies.

The Ernest Orlando Lawrence Award

The Ernest Orlando Lawrence Award was established in 1959 in honor of a scientist who helped elevate American physics to world leadership.

E. O. Lawrence was the inventor of the cyclotron, an accelerator of subatomic particles, an achievement for which he was awarded the 1939 Nobel Prize in Physics. The Radiation Laboratory he developed at Berkeley during the 1930s ushered in the era of "big science," in which experiments were no longer done by an individual researcher and a few assistants on the table-top of an academic lab but by large, multidisciplinary teams of scientists and engineers in entire buildings full of sophisticated equipment and huge scientific machines. During World War II, Lawrence and his accelerators contributed to the Manhattan Project, and he later played a leading role in establishing the U.S. system of national laboratories, two of which (Lawrence Berkeley and Lawrence Livermore) now bear his name.

Shortly after Lawrence's death in August 1958, John A. McCone, Chairman of the Atomic Energy Commission, wrote to President Eisenhower suggesting the establishment of a memorial award in Lawrence's name. President Eisenhower agreed, saying, "Such an award would seem to me to be most fitting, both as a recognition of what he has given to our country and to mankind, and as a means
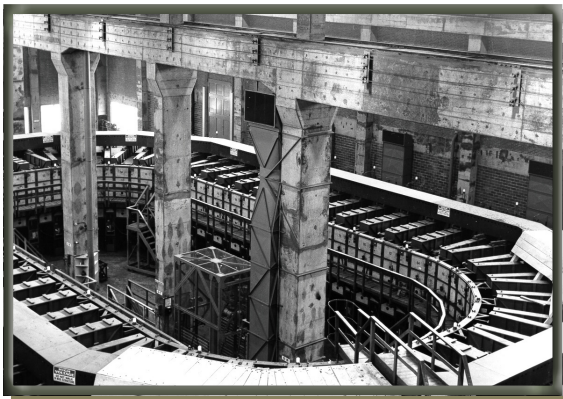
Alpha Track Calutron at the Y-12 Plant at Oak Ridge, Tennessee from the Manhattan Project, used for uranium enrichment by electromagnetic separation process.
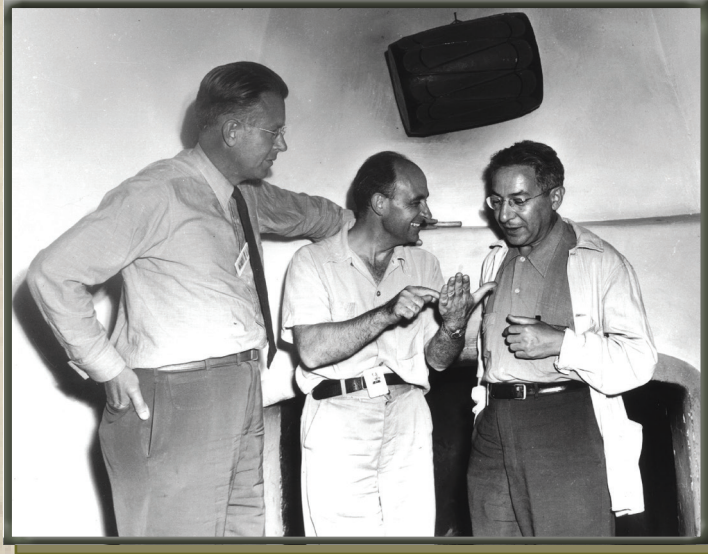
of helping to carry forward his work through inspiring others to dedicate their lives and talents to scientific effort." The first Lawrence Awards were given in 1960.

The Lawrence Award honors scientists and engineers at mid-career (defined as within 20 years of receiving a Ph.D.), showing promise for the future, for exceptional contributions in research and development supporting the Department of Energy and its mission to advance the national, economic, and energy security of the United States.

The Lawrence Award may be awarded in each of the following nine categories: Atomic, Molecular, and Chemical Sciences; Biological and Environmental Sciences; Computer, Information, and Knowledge Sciences; Condensed Matter and Materials Sciences; Energy Science and Innovation; Fusion and Plasma Sciences; High Energy Physics; National Security and Nonproliferation; and Nuclear Physics. The Lawrence Awards are administered by the Department of Energy's Office of Science.

Each Lawrence Award category winner receives a citation signed by the Secretary of Energy, a gold medal bearing the likeness of Ernest Orlando Lawrence, and a $20,000 honorarium; if there are co-winners in a category, the honorarium is shared equally.
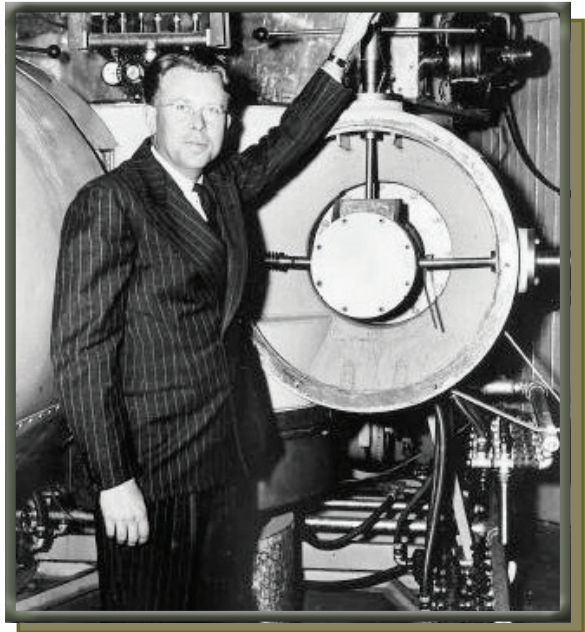
THE ERNEST ORLANDO LAWRENCE AWARD LAUREATES

2021
Matthew C. Beard
Luis Chacón
Andrew J. Landahl
Jennifer Pett-Ridge
Sofia Quaglioni
Philip C. Schuster
Rachel A. Segalman
Daniel B. Sinars
Natalia Toro
Jie Xiao

2020
Yi Cui
Dana M. Dattelbaum
Dustin H. Froula
M. Zahid Hasan
Daniel Kasen
Robert B. Ross
Susannah G. Tringe
Krista S. Walton

2014
Mei Bai
Carolyn R. Bertozzi
Pavel Bochev
Eric E. Dors
Christopher L. Fryer
David J. Schlegel
Brian D. Wirth
Peidong Yang
Jizhong (Joe) Zhou

2013
Adam P. Arkin
Siegfried H. Glenzer

2013
Stephen C. Myers
John L. Sarrao
John C. Wagner
Margaret S. Wooldridge

2011
Riccardo Betti
Paul C. Canfield
Mark B. Chadwick
David E. Chavez
Amit Goyal
Thomas P. Guilderson
Lois Curfman McInnes
Bernard Matthew Poelker
Barry F. Smith

2009
Joan F. Brennecke
William Dorland
Omar Hurricane
Wim Leemans
Zhi-Xun Shen
Sunney Xie

2006
A. Paul Alivisatos
Malcolm J. Andrews
Moungi G. Bawendi
Arup K. Chakraborty
My Hang V. Huynh
Marc Kamionkowski
John M. Zachara
Steven John Zinkle

2004
Nathaniel J. Fisch

2004	Bette Korber	1993	James G. Anderson
	Claire E. Max		Robert G. Bergman
	Fred N. Mortensen		Alan R. Bishop
	Richard J. Saykally		Yoon I. Chang
	Ivan K. Schuller		Robert K. Moyzis
	Gregory W. Swift		John W. Shaner
			Carl Wieman

2004

Bette Korber
Claire E. Max
Fred N. Mortensen
Richard J. Saykally
Ivan K. Schuller
Gregory W. Swift

2002

C. Jeffrey Brinker
Claire M. Fraser
Bruce T. Goodwin
Keith O. Hodgson
Saul Perlmutter
Benjamin D. Santer
Paul J., Turinsky

1998

Dan Gabriel Cacuci
Joanna S. Fowler
Laura H. Greene
Steven E. Koonin
Mark H. Thiemens
Ahmed H. Zewail

1996

Charles Roger Alcock
Mina J. Bissell
Thom H. Dunning, Jr.
Charles V. Jakowatz, Jr.
Sunil K. Sinha
Theofanis G. Theofanous
Jorge Luis Valdes

1994

John D. Boice, Jr.
E. Michael Campbell
Gregory J. Kubas
Edward William Larsen
John D. Lindl
Gerard M. Ludtka
George F. Smoot
John E. Till

1993

James G. Anderson
Robert G. Bergman
Alan R. Bishop
Yoon I. Chang
Robert K. Moyzis
John W. Shaner
Carl Wieman

1991

Zachary Fisk
Richard Fortner Rulon
Linford Peter Schultz
Richard E. Smalley
J. Pace Vandevender

1990

John J. Dorning
James R. Norris
S. Thomas Picraux
Wayne J. Shotts
Maury Tigner
F. Ward Whicker

1988

Mary K. Gaillard
Richard T. Lahey, Jr.
Chain Tsuan Liu
Gene H. McCall
Alexander Pines
Joseph S. Wall

1987

James W. Gordon
Miklos Gyulassy
Sung-Hou Kim
James L. Kinsey
J. Robert Merriman
David E. Moncton

1986

James J. Duderstadt
Helen T. Edwards
Joe W. Gray

1986	C. Bradley Moore	**1980**	Charles D. Scott
	Gustavus J. Simmons		
	James L. Smith	**1977**	James D. Bjorken
			John L. Emmett
1985	Anthony P. Malinauskas		F. William Studier
	William H. Miller		Gareth Thomas
	David R. Nygren		Dean A. Waters
	Gordon C. Osbourn		
	Betsy Sutherland	**1976**	A. Philip Bray
	Thomas A. Weaver		James W. Cronin
			Kaye D. Lathrop
1984	Robert W. Conn		Adolphus L. Lotts
	John J. Dunn		Edwin D. McClanahan
	Peter L. Hagelstein		
	Siegfried S. Hecker	**1975**	Evan H. Appelman
	Robert B. Laughlin		Charles E. Elderkin
	Kenneth N. Raymond		William A. Lokke
			Burton Richter
1983	James F. Jackson		Samuel C. Ting
	Michael E. Phelps		
	Paul H. Rutherford	**1974**	Joseph Cerny
	Mark S. Wrighton		Harold Paul Fourth
	George B. Zimmerman		Henry C. Honeck
			Charles A. McDonald
1982	George F. Chapline, Jr.		Chester R.Richmond
	Mitchell J. Feigenbaum		
	Michael J. Lineberry	**1973**	Louis Baker
	Nicholas Turro		Seymour Sack
	Raymond E. Wildung		Thomas E. Wainwright
			James Robert Weir
1981	Martin Blume		Sheldon Wolff
	Yuan Tseh Lee		
	Fred R. Mynatt	**1972**	Charles C. Cremer
	Paul B. Selby		Sidney D. Drell
	Lowell L. Wood		Marvin Goldman
			David A. Shirley
1980	Donald W. Barr		Paul F. Zweifel
	B. Grant Logan		
	Nicholas P. Samios	**1971**	Thomas B. Cook
	Benno P. Schoenborn		Robert L. Fleischer

1971
Robert L. Hellens
P. Buford Price
Robert M. Walker

1970
William J. Bair
James W. Cobble
Joseph M. Hendrie
Michael M. May
Andrew M. Sessler

1969
Geoffrey F. Chew
Don T. Cromer
Ely M. Gelbard
F. Newton Hayes
John H. Nuckolls

1968
James R. Arnold
E. Richard Cohen
Val L. Fitch
Richard Latter
John B. Storer

1967
Mortimer M. Elkind
John M. Googin
Allen F. Henry
John O. Rasmussen
Robert N. Thorn

1966
Howard M. Agnew
Ernest C. Anderson
Murray Gell-Mann
John R. Huizenga
Paul R. Vanstrum

1965
George A. Cowan
Floyd M. Culler
Milton C. Edlund
Theodore B. Taylor
Arthur C. Upton

1964
Jacob Bigeleisen
Albert L. Latter
Harvey M. Pratt
Marshall N. Rosenbuth
Theos J. Thompson

1963
Herbert J.C. Kouts
L. James Rainwater
Louis Rosen
James M. Taub
Cornelius A. Tobias

1962
Andrew A. Benson
Richard P. Feynman
Herbert Goldstein
Anthony L. Turkevich
Herbert F. York

1961
Leo Brewer
Henry Hurwitz, Jr.
Conrad L. Longmire
Wolfgang K. H. Panofsky
Kenneth E. Wilzbach

1960
Harvey Brooks
John S. Foster, Jr.
Isadore Perlman
Norman F. Ramsey, Jr.
Alvin M. Weinberg

No individual is alone responsible for a single stepping stone along the path of progress, and where the path is smooth progress is most rapid.

–Ernest Orlando Lawrence