

National Aeronautics and
Space Administration

A NASA logo is centered at the top, surrounded by a semi-circle of blue dots of varying sizes. Below this, the text "GLENN RESEARCH CENTER HALL OF FAME" is written in a serif font.

GLENN
RESEARCH CENTER
HALL OF FAME

INAUGURAL
INDUCTION CEREMONY
FRIDAY, SEPTEMBER 25, 2015

The NASA logo with the "100" integrated into the "A", where the "1" is a vertical bar and the "00" are two overlapping circles. A curved arrow points from the end of the "100" upwards and to the right.

NASA
1 9 1 5 - 2 0 1 5

CELEBRATING **100** YEARS
OF INNOVATION



DR. BILL BARRY has served as NASA's Chief Historian since 2010. Prior to being selected for this position, he served as the NASA European Representative at the U.S. Embassy in Paris.

In his earlier activities as a Senior International Programs Specialist at Headquarters, he also supported a number of other international space activities, notably the International Space Station Program's Multilateral Coordination Board. He retired from the Air Force after a distinguished 22-year career. While serving in the Air Force he alternated between flying assignments in the KC-135 air refueling tanker and duty on the faculty of the Department of Political Science at the U.S. Air Force Academy. A graduate of the academy, Barry obtained his master's degree from Stanford University and doctoral degree from Oxford University.



GREG DEE came to WKYC in February 2015. He is a native of Connecticut. Growing up in New England gave him exposure to all kinds of weather, beginning his love of all things storms.

Dee received his degree in meteorology from Florida State University as well as his master's degree in geography. His first job was as Chief Meteorologist in Dothan, Alabama. During his time there, Greg began to develop the skills necessary for covering severe weather. His coverage of an EF-3 tornado in Enterprise, Alabama, earned him the 2008 AMS Meteorologist of the Year award.



JAMES FREE has served as the director of John H. Glenn Research Center in Cleveland, Ohio, since January 4, 2013. He is responsible for planning, organizing, and directing the activities required in accomplishing the missions assigned to the Center. Glenn is engaged in research, technology, and systems-development programs in space propulsion, space power, space communications, aeronautical propulsion, microgravity sciences,

and materials. Free has served in a number of other leadership positions including Director of Space Flight Systems at Glenn, where he was responsible for overseeing the management of Glenn's significant activities in the Agency's Spaceflight Programs. He held that position from September 2009 to November 2010. He was also Chief of Glenn's Orion Projects Office from February to September 2009, responsible for all Orion-related work at the center. Free, a native of Northeast Ohio, began his NASA career in 1990 at Goddard Space Flight Center in Greenbelt, Maryland, as a propulsion engineer and later as a systems engineer on several spacecraft. He earned his bachelor's degree in aeronautics from Miami University in Oxford, Ohio, and his master's degree in space systems engineering from Delft University in the Netherlands.



AGENDA

Glenn Research Center Hall of Fame
Inaugural Induction Ceremony
September 25, 2015

Master of Ceremonies

Mr. Greg Dee, WKYC Meteorologist

Center Director

Mr. Jim Free, Center Director

Special Presenter

Dr. Bill Barry, NASA Chief Historian

Color Guard

Lorain High School Junior Army ROTC

Star Spangled Banner

Ra-Deon Sledge, Code V

Honorees

Annie J. Easley – Represented by Ms. June Bahan-Szucs
Bruce T. Lundin – Represented by Larry Ross
James J. Modarelli – Represented by James Modarelli III
I. Irving Pinkel – Represented by Dan Pinkel
Edward “Ray” Sharp – Represented by Irene Geye
Dr. Abraham “Abe” Silverstein – Represented by David Silverstein

The Giants of Heat Transfer

Dr. Robert Deissler – Represented by Robert J. Deissler
Dr. Simon “Si” Ostrach – Representing himself
Dr. Robert Siegel – Representing himself



ANNIE J. EASLEY

In 1955, Easley began her career as a “human computer,” doing computations for researchers. This involved analyzing problems and doing calculations by hand. Her earliest work involved running simulations for the newly planned Plum Brook Reactor Facility.

When hired, she was one of only four African-American employees at the Laboratory that would become the NASA Glenn Research Center. In a 2001 interview she said that she had never set out to be a pioneer. “I just have my own attitude. I’m out here to get the job done, and I knew I had the ability to do it, and that’s where my focus was.”

When human computers were replaced by machines, Easley evolved along with the technology. She developed and implemented code used in researching energy-conversion systems, analyzing alternative power technology—including the battery technology that was used for early hybrid vehicles, as well as for the Centaur upper-stage rocket.

In the 1970s, Easley returned to school to earn her degree in mathematics from Cleveland State, doing much of her coursework while also working full time. A firm believer in education and in her mother’s advice “You can be anything you want to be, but you have to work at it,” Easley was very dedicated in her outreach efforts at NASA. She not only participated in school tutoring programs but was a very active participant in the speaker’s bureau—telling students about NASA’s work and inspiring especially female and minority students to consider STEM careers.

Easley would humbly state that she never set out to be a role model or trailblazer. Many who knew her would say that it was not just the work that she did that made a difference; it was her energy and positive attitude that had a tremendous impact on the Center. In the 35-page transcript of her 2001 NASA oral history interview, Easley consistently emphasizes the importance of teamwork and expresses appreciation and admiration for those she worked with. There are many illustrations throughout her career of her determination and discipline, kindness, and generosity.

Easley retired in 1989, but she remained an active participant in the Speaker’s Bureau and the Business & Professional Women’s association. Annie Easley passed away on June 25, 2011.



BRUCE T. LUNDIN

Bruce Lundin's 35-year career began in 1943 when the National Advisory Committee for Aeronautics (NACA) lab that would become NASA Glenn was still known as the Aircraft Engine Research Laboratory. Almost immediately he was thrown into the secret new field of jet engines.

This work between 1943 and 1946 yielded concepts such as the afterburner, variable-area nozzle, and reverse thruster—components that remain basic elements of many modern jet aircraft.

Lundin was a vocal advocate for the expansion of the Lab's Research to spacecraft propulsion. He felt passionately that the NACA should conduct and coordinate all space-related research. In December 1957, Lundin drafted his seminal "Some Remarks on a Future Policy and Course of Action for the NACA." This document outlined in detail the formation of a new space agency based on the NACA structure.

With the establishment of NASA in 1958, Lundin was named Associate Director of the NASA Lewis Research Center. Under Lundin's guidance, Lewis expanded its space propulsion and power research with the development of electric-, solar-, and nuclear-power-generating systems for spacecraft and high-energy chemical, electric, and nuclear propulsion systems.

In 1967, Lundin was named Center Director and sought new areas of research and increased Lewis's research efforts on energy-efficient engines and noise reduction for the airline industry. Lewis undertook a wide range of alternative energy programs. One of the most successful efforts was a wind energy program in partnership with what is today the Department of Energy. This program set a precedent for what has become an entire wind turbine industry. Lundin also successfully molded Lewis into a leading energy-conversion laboratory. Lewis's greatest achievements during Lundin's tenure were in the Launch Vehicles Division. The group was responsible for not only maintaining and updating the Centaur rocket but for integrating the payload with the Atlas and Titan boosters.

Lundin retired in 1977 after a long career of outstanding leadership in research, organizing resources for effective and timely execution, and inspiring extraordinary efforts from his staff to solve complex problems. Bruce Lundin passed away at the age of 86 on January 24, 2006.



JAMES J. MODARELLI

In 1949, after graduating from the Cleveland Institute of Art, James “Jim” Modarelli began his career as an artist-designer at the laboratory that would become NASA Glenn. When the NACA was approved to be absorbed into NASA, the new space agency, employees were invited to submit designs for the Agency’s logo. Modarelli, who was serving as the Management Services Division Chief at the time, submitted the winning designs. The official NASA seal and the less formal NASA “meatball” insignia are among the most recognized emblems in the world. The logos, which include symbols representing the space and aeronautics missions of NASA, became official in 1959. In July 1958, Modarelli participated in a tour at the Ames Unitary Plan Wind Tunnel, where he viewed a model of a radical supersonic airplane designed for flight at Mach 3.0. With a cambered, twisted arrow wing and an upturned nose, the model deeply impressed Modarelli. He later stylized the radical features of the arrow-wing configuration in his evolution of the NASA seal design; the wing would also become an element of the NASA insignia.

After NASA was formed, Modarelli briefly went to the new NASA Headquarters to serve as the Exhibits Chief and was charged with developing the Agency’s exhibits program. He returned to the NASA Lewis Research Center in Cleveland in 1961, where he again served as the Management Services Division Chief. He also cochaired the historic 1962 Space Fair at the Cleveland Public Auditorium and headed many special, one-of-kind events. These included the summer camp for pre-apprentice training classes for minority high school graduates, the NACA Inspections, and many employee morale activities such as the Combined Federal Campaign and the 100 Year Relay. James Modarelli retired in 1979 and passed away on September 27, 2002.



I. IRVING PINKEL

In 1940 Pinkel joined the staff at the National Advisory Committee for Aeronautics' (NACA's) Langley Memorial Laboratory. Pinkel transferred to Cleveland, Ohio, in 1942 when the NACA opened its Aircraft Engine Research Laboratory.

Pinkel was assigned to the icing research program in the mid-1940s, where he worked with the researchers to evaluate deicing systems and undertook a multiyear effort to study the composition of ice-producing clouds. In 1949 Pinkel was named Associate Chief of the Physics Division. In this role, he investigated slippery runways, lightning strikes to aircraft, and the jettisoning of fuel in flight.

In 1949, Irving Pinkel was asked to personally supervise the Crash Fire Test program. The group identified fuel disbursement, ignition sources, and combustible materials, and developed an inerting system to cool ignition points and extinguish fires within the engine upon impact. The researchers also examined the forces imposed on both the aircraft and its passengers during a crash. Pinkel and his team provided guidelines for better overall aircraft design and developed a flexible crash-resistant seat that greatly minimized the forces on the occupants.

NASA called upon Pinkel's crash fire experience following the Apollo 1 fire in January 1967. Within days, Pinkel arrived at the NASA Kennedy Space Center to help inspect the damaged capsule, develop a timeline of events, and offer insight into the origin and propagation of the fire. Pinkel spent over a year helping with the redesign of the Apollo capsule and spacesuits.

Following the investigation, Pinkel served as Director of the new NASA Aerospace Safety Research and Data Institute (ASRDI). ASRDI collected information regarding all of NASA's safety problems into a single dynamic database accessible to the entire Agency. Pinkel authored papers on safety issues for engineers to consider while designing the space shuttle. While in this position, he was summoned as an official observer to the review board for the Apollo 13 incident in April 1970.

Pinkel retired 2 years later in 1972 after 32 years of NACA and NASA service. He remained active in retirement as a consultant for national laboratories and the aerospace industry, and he frequently participated in airline crash investigations. At the age of 95, Irving Pinkel passed away on March 13, 2008.



EDWARD "RAY" SHARP

Edward "Ray" Sharp came to Cleveland in 1941 as the construction manager of the new Aircraft Engine Research Laboratory. He served as the first manager when the laboratory began operation in 1942, was named director in 1947, and remained at the helm until his retirement in 1960.

When Sharp arrived in Cleveland to personally oversee the construction, it was already over budget and behind schedule. For the next year and a half, Sharp worked tirelessly to complete the work and make the Lab operational. The completion of the hangar in the fall of 1941 was the first big accomplishment. This permitted the first transfer of Langley personnel to Cleveland in December 1941, just as the United States was entering the war. Sharp was crucial to the difficult negotiation of a contract with the primary construction company. He and Headquarters officials brought the contract to the White House on December 31, where President Roosevelt approved it. The pace of the construction accelerated almost immediately, and the Laboratory was completed ahead of schedule.

Sharp had an amiable and gracious style of management, and he created an atmosphere that encouraged cooperation among his staff. He frequently left his office to visit the shops and laboratories to talk with employees and thank them for their efforts.

Sharp's legal skills helped him to negotiate contracts and run the day-to-day business activities, but he left the technical decisions to the engineers. In this role, he served as the catalyst for technological advancements by providing workers with the equipment, money, and space they needed to perform their work.

Sharp also encouraged the use of young, untrained individuals. He was among the first to recognize the potential of teenage model aircraft enthusiasts. The lab used aircraft model builders to create models for wind tunnel tests, but Sharp felt that their ability to continually improve designs was applicable to a range of NACA positions. To facilitate this, he instituted the Apprentice Program, which trained unskilled individuals to be mechanics, electricians, and technicians.

Ray Sharp passed away in July 1961. In 1986, the new Employee Center was named in his honor.



DR. ABRAHAM “ABE” SILVERSTEIN

Abe Silverstein began his professional career with the National Advisory Committee for Aeronautics (NACA), in 1929, at the Langley Memorial Aeronautical Laboratory in Hampton, Virginia.

In 1943, he was transferred to the NACA Aircraft Engine Research Laboratory at Cleveland, Ohio. As Chief of the Wind Tunnels and Flight Division, Silverstein directed research in propulsion aerodynamics in the Altitude Wind Tunnel. These investigations led to significant improvements in both reciprocating and early turbojet aircraft engines. He also pioneered research on large-scale ramjet engines.

Following World War II, Silverstein was responsible for the concept, design, and construction of the nation’s first supersonic propulsion wind tunnels. The investigations in these facilities greatly contributed to the development of present-day supersonic aircraft. In 1949, he was placed in charge of all research at Lewis and, in 1952 was appointed Associate Director of the Laboratory. Silverstein was called to NACA Headquarters in Washington, DC, in 1958, to plan the organization and programs for a new space agency, the National Aeronautics and Space Administration (NASA), which would use the NACA as its core. Subsequently, he was appointed Director of NASA’s Office of Space Flight Programs, which included the development of both manned and unmanned spacecraft. He initiated the Tiros weather satellites and communication satellites and directed the task forces that carried out the Mercury manned flights. This activity laid the groundwork for the Gemini and Apollo programs and the successful landing of men on the Moon. He is credited with naming both the Mercury and Apollo programs.

Dr. Silverstein returned to Cleveland in 1961 as Director of the NASA Lewis Research Center, responsible for developing advanced space power and propulsion systems. Silverstein was the guiding force behind the creation of the Centaur launch vehicle. From its first successful launch in 1963 to the end of the century, Centaur was the workhouse of the American space program, propelling spacecraft to the Moon and the outer planets and taking both scientific and commercial satellites into Earth orbit.

Abe Silverstein retired in 1969 after 40 years of government service. In 1994, the 10- by 10-Foot Supersonic Wind Tunnel was named in his honor. Dr. Silverstein passed away on June 1, 2001, at the age of 92.

THE GIANTS OF HEAT TRANSFER: DR. ROBERT DEISSLER, DR. SIMON OSTRACH, AND DR. ROBERT SIEGEL

The NASA Glenn Research Center established itself as a hub of heat transfer expertise early in its history, when it was a National Advisory Committee on Aeronautics (NACA) laboratory. Rooted in basic, instead of applied, research, a group of the lab's heat transfer researchers developed new theories that would transform the body of knowledge. As Virginia Dawson explains in her history of the Center, *Engines and Innovations*, "A new theory was like a new piece of hardware, something on the shelf, ready if it was needed in the future." Management was more comfortable with a new compressor or afterburner, but the value of theoretical contributions was also appreciated. The theoretical skills of these heat transfer experts made them world renown in their own right, and the application of their theories helped the Center to expand and excel in emerging fields like jet engines, nuclear propulsion, and space exploration.



DR. ROBERT DEISSLER began his broad heat transfer career in 1947 at the NACA Aircraft Engine Research Laboratory, which would later become NASA Glenn. He gained early recognition in the field for a series of papers dealing with turbulent flow and heat transfer of variable-property fluids in pipes or tubes. He quickly advanced to Chief of the Heat Transfer Branch. Deissler was recognized as a major contributor to the theory of turbulent-flow heat transfer, and he authored many papers and articles, as well as an authoritative text book, on the subject. Robert Deissler retired in 1994 and passed away on August 16, 2015.



When **DR. SIMON "SI" OSTRACH** began his career in 1944 at the Aircraft Engine Research Laboratory, he was working on engine cooling problems for World War II aircraft. After the war, he performed thermodynamic analyses on turbojet and turboprop engines.

Over the course of a 70-year career, Ostrach has made groundbreaking contributions to engineering and to the understanding of natural convection and physiologic and microgravity flows. His primary current research interest is the effect of weightlessness on the behavior of fluids and how flows, which occur in nature and various technologies, are induced and affected by various forces. Knowledge gained through his research has enabled the development of technologies for producing crystals for semiconductors and for producing microelectromechanical systems (MEMS).

Ostrach also designed major experiments that flew aboard the space shuttle in 1992 and 1995. These provided significant insight for developing life-support systems in space, as well as for ground-based materials processing.

After leaving NASA in 1960, Ostrach was a professor and researcher at the Case Western Reserve University for 45 years. He is now the Wilbert Austin Distinguished Professor Emeritus of Engineering at Case.



DR. ROBERT SIEGEL began his career at the Laboratory in 1955. His first work was with the heat transfer group, investigating issues with nuclear aircraft propulsion. Later, he became head of the Analytical Heat Transfer Section. Siegel began investigating heat transfer for conditions in space, leading him to design the world's first drop tower in 1957.

Siegel is regarded internationally as an expert on heat transfer, thanks in part to his text book, *Thermal Radiation Heat Transfer*, which he coauthored with J.W. Howell. When Siegel set out to develop a course on heat transfer for the Center, he was not able to find a suitable text-book. The course notes he developed grew into this text book, which was published in 1972. There have been five editions of the book, and it has been translated into several languages. It is still used widely as a graduate-level textbook. Robert Siegel retired from NASA in 1999.

NASA
1915 - 2015

The logo features the word "NASA" in a bold, black, sans-serif font. The letter "A" is replaced by a yellow circular emblem with a black outline, which is a stylized representation of the NASA logo's "meatball" design. A thin black horizontal line runs beneath the letters "N", "A", "S", and "A". From the right end of this line, a thin black curved line extends upwards and to the right, ending in a black arrowhead pointing towards the top right corner.