



© Robert Berks, 1978; photograph by Alex Jamison

The Einstein Memorial

No more appropriate memorial could stand on the grounds of the National Academies than one honoring Albert Einstein, whose work led to a new understanding of this world and the universe.

The memorial depicts Einstein resting on a bench of white granite from Mount Airy, North Carolina. At his feet is a circular sky map on a 28-foot field of emerald-pearl granite from Larvik, Norway. The map is embedded with more than 2,700 small metal studs representing the planets, sun, moon, stars, and other celestial objects positioned as they were at noon on April 22, 1979, when the memorial was unveiled and dedicated.

The statue holds in its left hand the mathematical equations that summarize three of Einstein's most important scientific contributions: the photoelectric effect, the equivalence of energy and matter, and the theory of general relativity. Behind the statue, at the back of the bench, are

three quotations that reflect Einstein's integrity as a scientist as well as his never-ending sense of wonder at the world and his passionate concern for social justice.

From the top of its head to the tip of its feet, the statue measures 21 feet and weighs 7,000 pounds. It was cast in bronze in 19 sections and then welded into its final form, over a period of 10 months, with the assistance of a crew of 25. The monument is supported by a concrete subbase sunk to bedrock at a depth of 23 to 25 feet. It was sculpted by Robert Berks, creator of more than 300 portraits of individuals in public and private life, including Enrico Fermi, Martin Luther King, Ernest Hemingway, Mary McLeod Bethune, and four U.S. presidents—Abraham Lincoln, Harry S. Truman, John F. Kennedy, and Lyndon B. Johnson.

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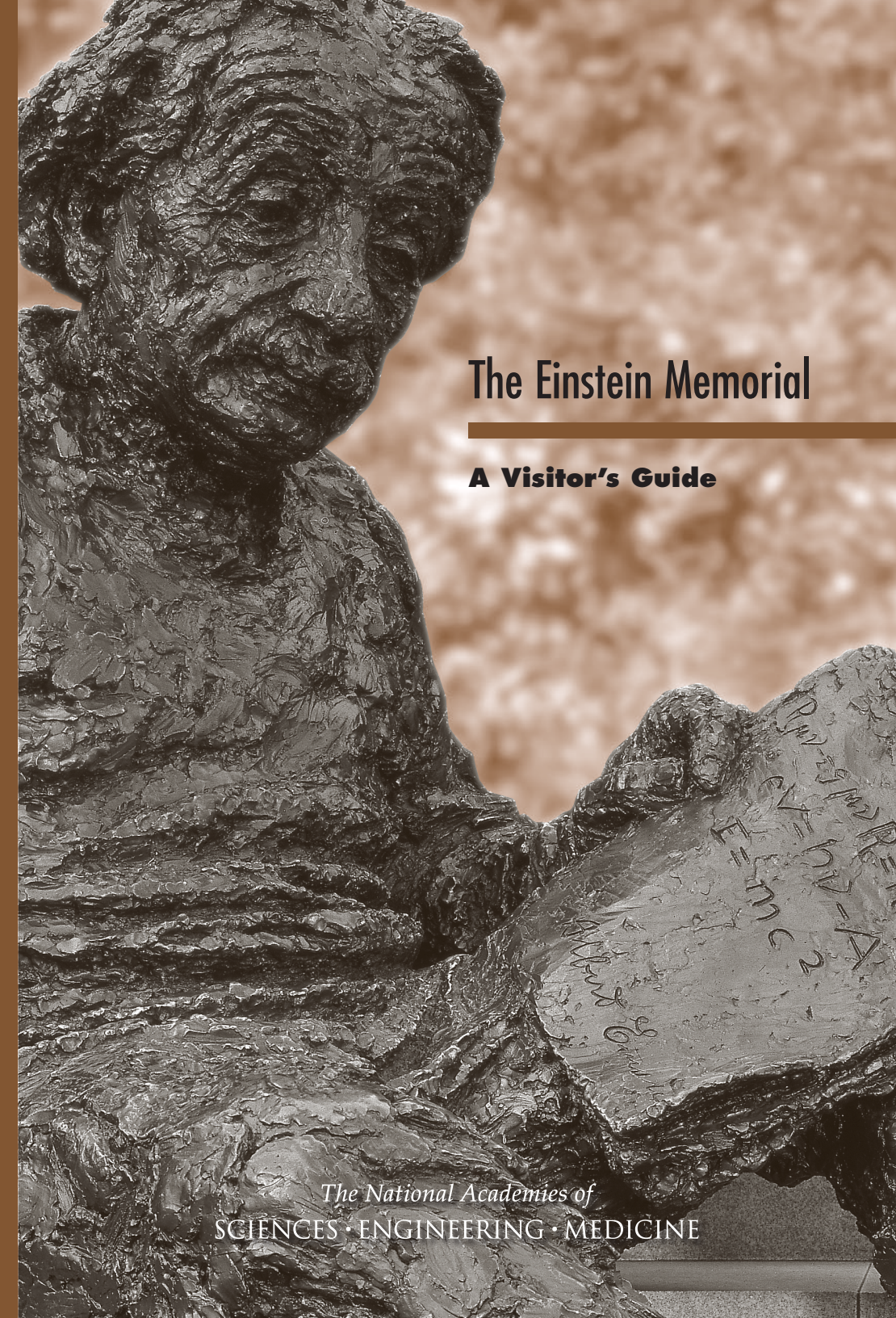
Are vaccines safe? How can we meet the challenges posed by climate change? What do we need to do to assure that the U.S. stays economically and scientifically competitive in a transformed global marketplace?

The nation's leaders grapple with a multitude of questions every day that are—at their core—issues of science, engineering, and medicine. In most cases, there are no easy answers. In fact, as society increasingly depends upon advances in these areas, the questions become evermore complicated.

The National Academies of Sciences, Engineering, and Medicine have a proven track record in providing expert, independent advice—taking matters out of the political arena to examine them objectively. Headquartered in Washington, D.C., the National Academies enlist the nation's most knowledgeable scientists, engineers, health professionals, and other experts, to volunteer their time for the study of specific issues. The results of their deliberations—more than 200 studies each year—have led to some of America's most significant and lasting efforts to improve the health, education, and welfare of the population.

Additional information about the institution and its work, including thousands of full-text reports, can be found online at [national-academies.org](https://www.national-academies.org).

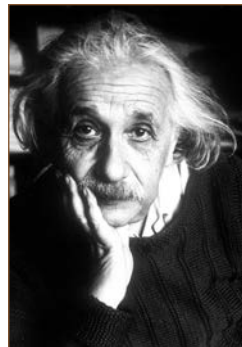
2101 Constitution Avenue, N.W., Washington, D.C. 20418



The Einstein Memorial

A Visitor's Guide

The National Academies of
SCIENCES • ENGINEERING • MEDICINE



Albert Einstein
March 14, 1879 - April 18, 1955

The right to search for truth implies also a duty; one must not conceal any part of what one has recognized to be true.
 —Albert Einstein

Albert Einstein, probably best known for his theory of relativity, revolutionized scientific thought with new concepts of space, time, mass, motion, and gravitation. His statement that energy and

matter are interchangeable was the key to the development of atomic energy.

Born in Ulm, Germany, in 1879, Einstein grew up in Munich. Unable to find a teaching job after graduating from a technical institute in Zurich, Switzerland, he accepted a post as examiner in the Swiss patent office. He worked there from 1902 to 1909, devoting only his spare time to his own scientific interests.

The year 1905 was a turning point in Einstein's life. He received a doctorate in physics from the University of Zurich and published three scientific papers, each of which became the basis for a new branch of physics.

The first paper described light as a stream of energy particles called "quanta." It explained the already observed photoelectric effect—that beams of light cause metals to release electrons that can be converted into electric current. It was for this work that Einstein received the Nobel Prize in physics in 1921.

The second paper, on the electrodynamics of moving bodies, contained Einstein's special theory of relativity. The famous equation $E=mc^2$ related mass directly to energy. The third paper explained that Brownian motion—the irregular movement of particles suspended in a liquid or a gas—is the result of bombardment by invisible atoms, whose existence was still a matter of debate at the time.

These papers earned Einstein a series of professorships in Switzerland and Prague. He moved in 1914 to Berlin, where he directed the Kaiser Wilhelm Physical Institute. Despite growing anti-Semitism, Einstein stayed there until Hitler came into power.

In 1933 Einstein came to the United States and joined the newly formed Institute for Advanced Study in Princeton, New Jersey. He became a citizen of the United States in 1940, was elected to membership in the National Academy of Sciences in 1942, and remained affiliated with the Institute for Advanced Study until his death in 1955.

In his later years, Einstein worked actively on behalf of world peace. But his strongest connection was to science. In a discussion of his political activities, he once said, "...politics is for the present, but an equation...is...for eternity."

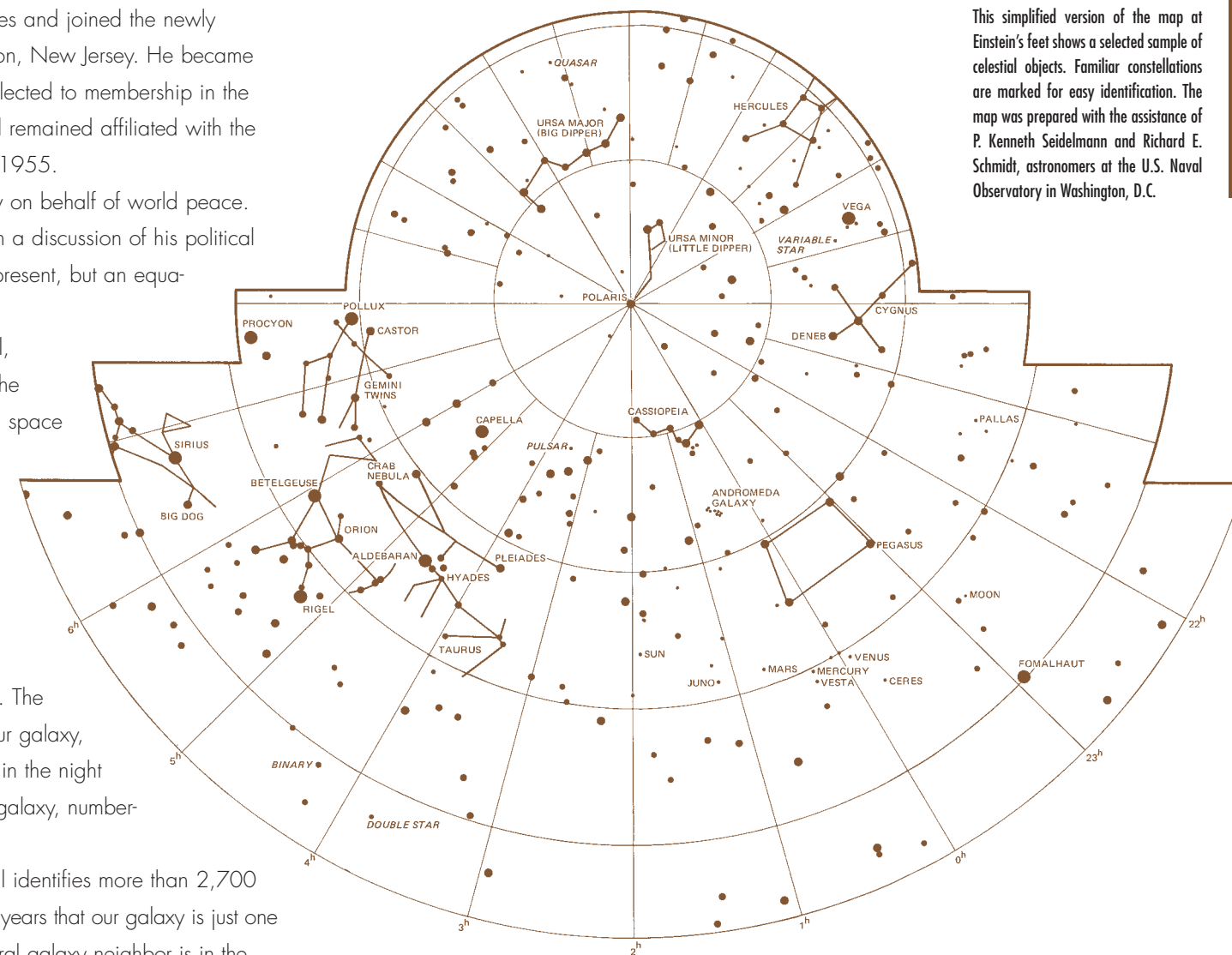
At the dedication of the Einstein memorial, Professor John Archibald Wheeler eulogized the statue as "a monument to the man who united space and time into space-time...a remembrance of the man who taught us...that the universe does not go on from everlasting to everlasting, but begins with a bang."

The Celestial Map

We live on a planet that orbits a star, our sun. The sun is one of 200 billion stars that make up our galaxy, the Milky Way. Without a telescope, we see in the night sky only the nearest and brightest stars of our galaxy, numbering just a few thousand.

The celestial map at the Einstein memorial identifies more than 2,700 stars. Astronomers have known for almost 100 years that our galaxy is just one of billions in the universe. Our closest large spiral galaxy neighbor is in the constellation of Andromeda, thus it is named the Andromeda galaxy. At a very dark site, away from city lights, you can see it as a faint "fuzz" in the autumn sky. Use the map in this brochure to try to find it at Einstein's feet. Five other galaxies are included in the map at the memorial. Can you find the others?

Other objects of particular interest include quasars, the enormously bright centers of very distant galaxies; variable stars, which change in brightness from



This simplified version of the map at Einstein's feet shows a selected sample of celestial objects. Familiar constellations are marked for easy identification. The map was prepared with the assistance of P. Kenneth Seidelmann and Richard E. Schmidt, astronomers at the U.S. Naval Observatory in Washington, D.C.

time to time; double stars, pairs that appear to be very close together; spectroscopic binaries, two stars orbiting one another so closely that they appear as a single star and can be differentiated only by study of their spectra; globular clusters, compact groupings of tens of thousands of stars traveling together in space; open clusters, irregularly shaped groups of a few hundred stars; and pulsars, collapsed stars that emit beacons of radio pulses at regular intervals.

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