Fermilab is America’s premier laboratory for particle physics and accelerator research, funded by the U.S. Department of Energy. Thousands of scientists around the world collaborate with Fermilab on research at the frontiers of discovery.

Particle physicists aim to discover what the universe is made of and how it works. They study the smallest building blocks of matter using some of the largest and most complex machines in the world. Fermilab hosts a range of cutting-edge experiments and develops and builds technologies that support particle physics research at locations around the world, including deep underground laboratories in South Dakota and Canada, the Large Hadron Collider in Europe, and the South Pole Telescope.

Together with our international partners, we expand humankind’s understanding of matter, energy, space and time, capturing imaginations and inspiring future generations.

About 4,000 scientists from over 50 countries use Fermilab and its accelerators, detectors and computing facilities annually.

Almost 1,000 university students participate in our research and programs every year.

Fermilab reaches around 100,000 people per year through its education, public engagement and tour programs.

More than 2,400 graduate students have received their Ph.D. degrees based on research at Fermilab.

Fermilab contributes electronics and other critical components to upgrades to the CMS particle detector and the Large Hadron Collider at CERN.

Scientists from research institutions in 41 states and 55 countries collaborate with Fermilab.
Fermilab advances technologies for quantum science, including quantum computers and sensors.

Muons experiments

Fermilab’s precision experiments with muons, cousins of the electron, allow scientists to explore energy scales far beyond those accessible at the highest-energy colliders.

The Muon $g-2$ experiment is looking for signs of undiscovered particles predicted to be bubbling in and out of empty space. The Mu2e experiment, currently under construction, aims to reveal new symmetries that may show how subatomic forces unify at high energies, as happened in the early universe.

Innovation

Fermilab is a world-leading center for superconducting magnets and radio-frequency cavities, crucial technologies for accelerators that also have potential in quantum computing and materials science.

Fermilab’s computing innovations have led to multiple applications, driven by our need to process massive amounts of information, store it and transmit it effectively.

From medical treatments to quantum science, innovative technologies from particle physics help transform the way we live.