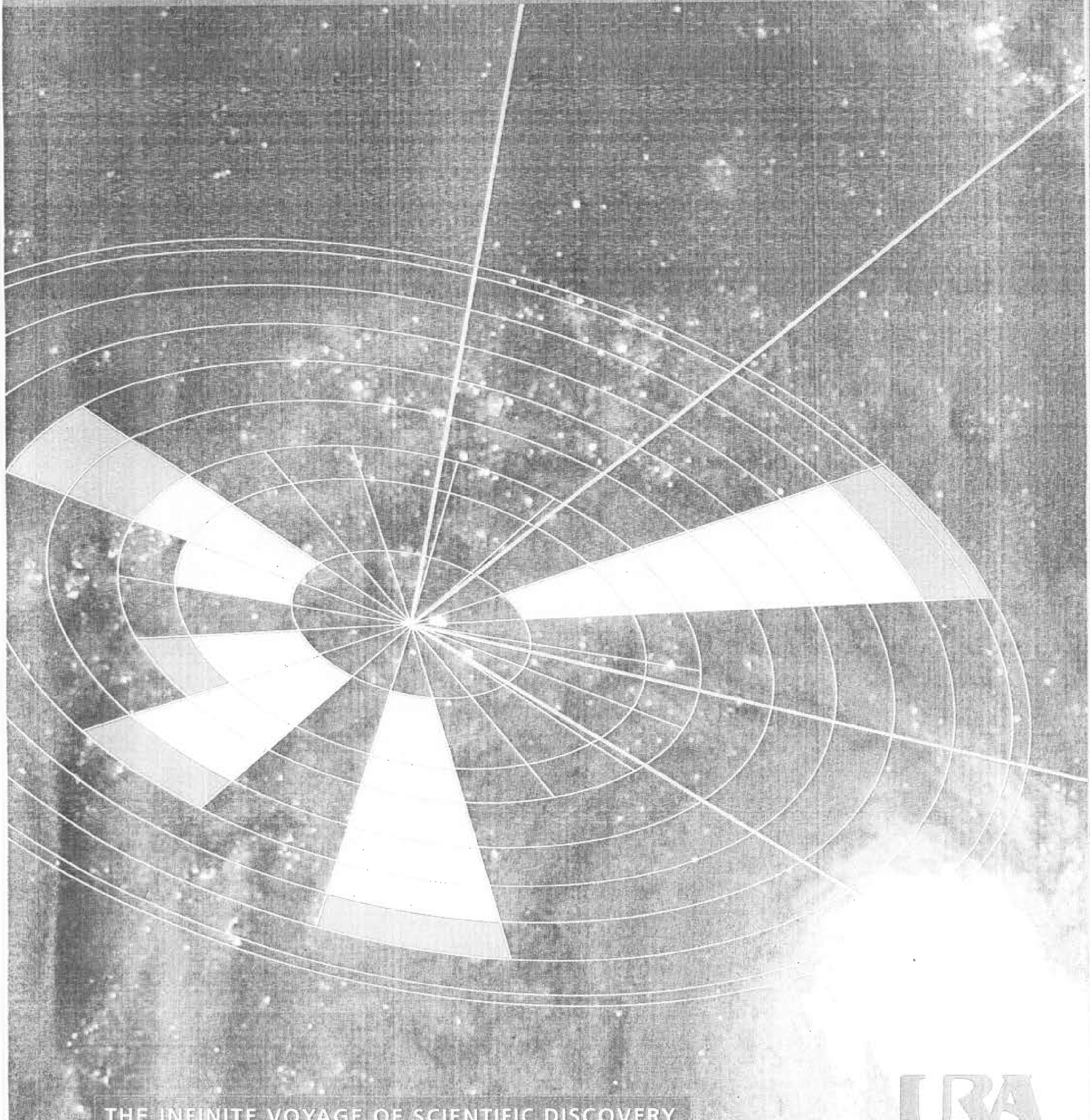
Universities Research Association, Inc.

ANNUAL REPORT 2001-2002



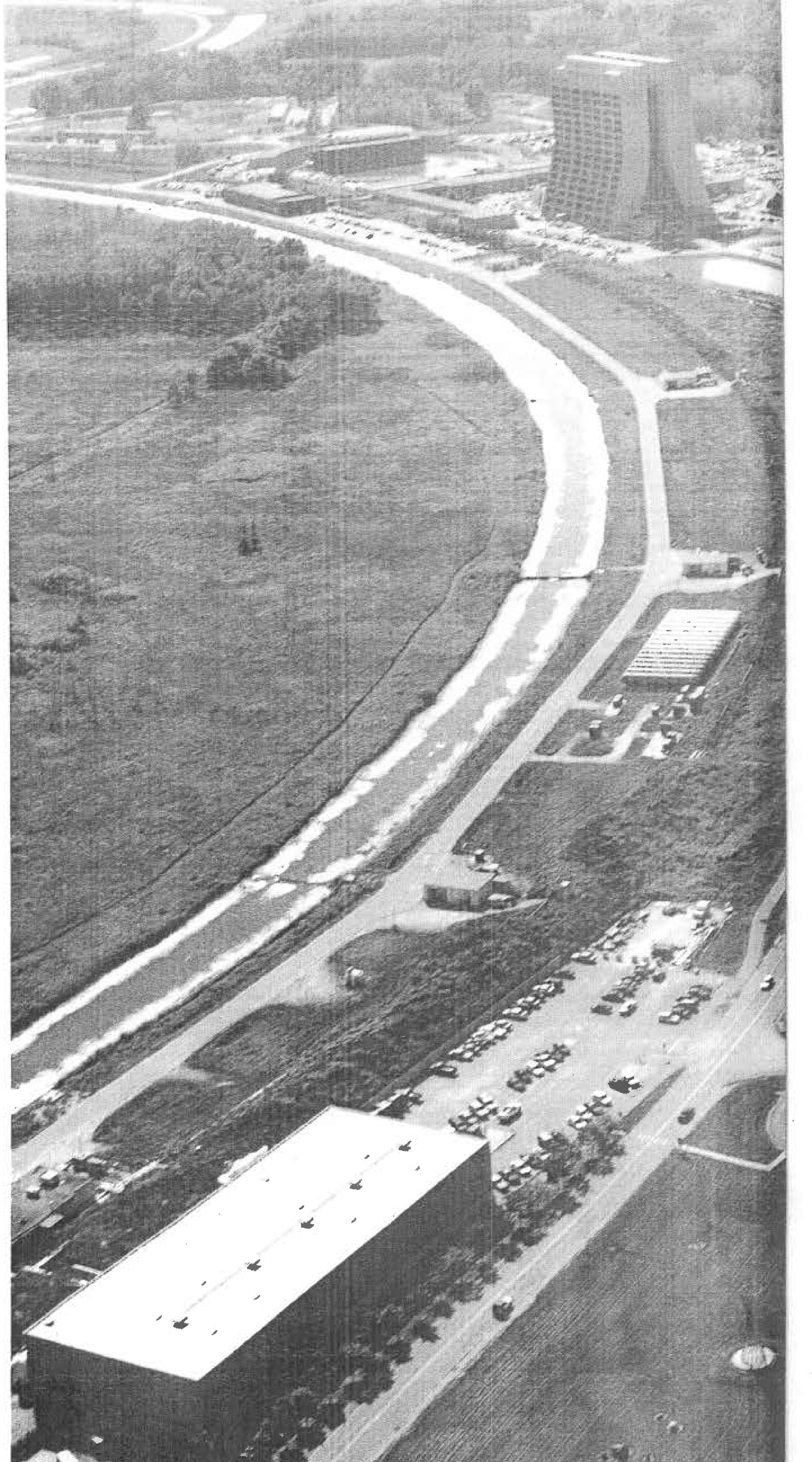
THE INFINITE VOYAGE OF SCIENTIFIC DISCOVERY

URA: Serving Universities and the Nation through Science

URA is "an entity in and by means of which universities and other research organizations may cooperate with one another, with the Government of the United States, and with other organizations, toward the support and use of laboratories, machines, and other research facilities, and toward the development of knowledge in the physical and biological sciences."

It was created "...for research, development and education in the physical and biological sciences, including all aspects of the field of high-energy physics, nuclear energy, and their engineering and other applications; and to educate and train technical, research and student personnel in said sciences."

Physicists from 34 states and 29 countries use particle accelerators at Fermi National Accelerator Laboratory in Illinois for forefront research in particle physics.



In this aerial view of Fermilab, the 16-story Wilson Hall (upper right) stands on the Illinois prairie adjacent to the 4-mile Tevatron accelerator ring. The CDF detector building appears in the foreground at the lower left.

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URA is a private not-for-profit corporation. A consortium of research universities, it serves as a contractor to the federal government for the operation of major scientific facilities. This volume—updated annually with new financial and organizational data—provides the historical context for URA's structure and mission, as well as highlights of its contributions to science, technology, industry and education.

MESSAGE FROM THE URA PRESIDENT

The past year has been both exciting and challenging for URA and its 90 member universities. Now beginning his fourth year at the helm of our flagship enterprise, Fermilab, Director Michael Witherell presides over an array of construction projects and planned experiments that is the boldest and most challenging since initial construction of the Laboratory 35 years ago. Meanwhile, the Laboratory has embarked on its second multi-year period of experiments, "Collider Run II." For much of the remainder of this decade, Fermilab will remain the world leader at the high energy frontier of particle physics and associated sciences.

URA President Frederick M. Bernthal

Fermilab is also on course to become the premier center for neutrino research, with civil construction continuing on the $170 million *Neutrinos from the Main Injector* (NUMI) project, the *MiniBooNE* experiment and ancillary efforts, all designed to probe the characteristics of the elusive neutrino. The former Soudan iron mine in northern Minnesota, site of the long-baseline neutrino detector, is also host to a new laboratory to search for enigmatic "Cold Dark Matter" in the universe.

Fermilab scientific, technical, and management talent continues to lead U.S. participation in the *Large Hadron Collider* project in Europe at CERN. Meanwhile, in the wake of endorsement by a special sub-panel of the DOE/NSF High Energy Physics Advisory Committee, Fermilab has joined with other laboratories in the U.S. to research and plan a next-generation electron-positron linear collider, in the hope that such a facility might be hosted by the U.S., and perhaps located at Fermilab.

The *Sloan Digital Sky Survey* collaboration, with Fermilab Director Emeritus Peoples as its Director, is now producing data that have been little short of spectacular. And in Mendoza Province, Argentina, the Engineering Test Array of the *Pierre Auger Cosmic Ray Observatory* recorded its first events in December 2001. A recent report from the National Academy of Sciences Committee on the Physics of the Universe was especially supportive of this effort, and recommended "that the United States ensure the timely completion and operation of the Southern Auger array." Further details on all of these undertakings can be found in the body of this report.

The Annual Meeting of the URA Council of Presidents (our "shareholders") was held in late January 2002, with Peter McPherson, President of Michigan State University, presiding and concluding his year as Chair of the Council. Council business was combined with the now-traditional Policy Forum, this year featuring addresses by John Marburger, former Chairman of the URA Board of Trustees and newly appointed Science Advisor to President Bush; physicist and Congressman Rush Holt; NSF Director Rita Colwell; and DOE Undersecretary Robert Card. Over 70 URA member universities were represented. At this meeting we were also most pleased to welcome into URA membership Illinois Institute of Technology, the leader among five universities involved in the recently established Illinois Consortium for Accelerator Research.

URA benefits greatly from the help of many distinguished individuals, who voluntarily provide leadership on our Board of Trustees, on the Fermilab Board of Overseers, and in related oversight activities. We are pleased and grateful that Joe B. Wyatt, Chancellor Emeritus of Vanderbilt University, continues to serve as Chair of our Trustees; Robert Galvin, former CEO of Motorola continues to provide his wise counsel to URA as Vice-Chair of the Trustees; Emanuel Fthenakis, former CEO of Fairchild Industries, lends his considerable experience and expertise as Chair of our Audit Committee; and David Shirley, Director Emeritus of the Lawrence Berkeley National Laboratory, remains Chair of the Fermilab Board of Overseers.

Last fall, for the first time, URA engaged a group of distinguished managers and administrators from government and industry as a special

The URA paradigm for university-government-laboratory partnership

DOE Fermi Area Office Manager Jane Monhart, U.S. Speaker of the House Dennis Hastert and Fermilab Director Michael Witherell observe DOE Chicago Operations Office Manager Marvin Gunn and Fred Bernthal signing the five-year extension of URA's contract with DOE for the management of Fermilab.

Visiting Committee for Fermilab Administrative and Operations Support, to review those functions at the Laboratory. The group was chaired by Linda Smith, former site manager at DOE's Nevada Test Site. And this year James Siegrist of Lawrence Berkeley National Laboratory chaired the URA Visiting Committee's annual programmatic review of Fermilab.

The extraordinary talent that assembles voluntarily from around the country and the world to assist URA in its undertakings reaffirms the benefits that derive from the URA partnership between our national laboratories and our nation's research universities. This paradigm of university-government-laboratory partnership has been frequently emulated at DOE and elsewhere, to the considerable benefit of the research enterprise.

In December 2001, with Speaker of the U.S. House of Representatives, Dennis Hastert, in attendance, we signed a five-year extension of our contract with DOE for the management and operation of Fermilab. As new chapters in the history of URA's scientific endeavors are written, our activities and plans remain grounded in the original URA Articles of Incorporation, key excerpts of which appear on the inside cover of this report. In keeping with that charter, URA remains ready to respond to other appropriate opportunities to serve the U.S. and international research community. We look forward to another exciting year of service to our university community and to the American people, as we continue the infinite voyage of scientific discovery.

MEMBER UNIVERSITIES

ALABAMA
University of Alabama-Tuscaloosa

ARIZONA
Arizona State University
University of Arizona

CALIFORNIA
California Institute of Technology
University of California-Berkeley
University of California-Davis
University of California-Irvine
University of California-Los Angeles
University of California-Riverside
University of California-San Diego
University of California-Santa Barbara
San Francisco State University*
Stanford University

COLORADO
University of Colorado-Boulder

CONNECTICUT
Yale University

FLORIDA
Florida State University
University of Florida

HAWAII
University of Hawaii-Manoa

ILLINOIS
University of Chicago
Illinois Institute of Technology
University of Illinois-Champaign/Urbana
Northern Illinois University
Northwestern University

INDIANA
Indiana University
University of Notre Dame
Purdue University

IOWA
Iowa State University
University of Iowa

KANSAS
Kansas State University

LOUISIANA
Louisiana State University
Tulane University

MARYLAND
Johns Hopkins University
University of Maryland-College Park

MASSACHUSETTS
Boston University
Harvard University
Massachusetts Institute of Technology
University of Massachusetts-Amherst
Northeastern University
Tufts University

MICHIGAN
Michigan State University
University of Michigan
Wayne State University

MINNESOTA
University of Minnesota

MISSOURI
Washington University

NEBRASKA
University of Nebraska-Lincoln

NEW JERSEY
Princeton University
Rutgers University

NEW MEXICO
New Mexico State University
University of New Mexico

NEW YORK
Columbia University
Cornell University
University of Rochester
Rockefeller University
State University of New York-Buffalo
State University of New York-Stony Brook
Syracuse University

NORTH CAROLINA
Duke University
University of North Carolina-Chapel Hill

OHIO
Case Western Reserve University
Ohio State University

OKLAHOMA
University of Oklahoma

OREGON
University of Oregon

PENNSYLVANIA
Carnegie Mellon University
Pennsylvania State University
University of Pennsylvania
University of Pittsburgh

RHODE ISLAND
Brown University

SOUTH CAROLINA
University of South Carolina

TENNESSEE
University of Tennessee-Knoxville
Vanderbilt University

TEXAS
University of Houston
University of North Texas
Prairie View A&M University*
Rice University
Southern Methodist University*
Texas A&M University
Texas Tech University
University of Texas-Arlington
University of Texas-Austin
University of Texas-Dallas

UTAH
University of Utah

VIRGINIA
Virginia Polytechnic Institute
University of Virginia
College of William and Mary

WASHINGTON
University of Washington

WISCONSIN
University of Wisconsin-Madison

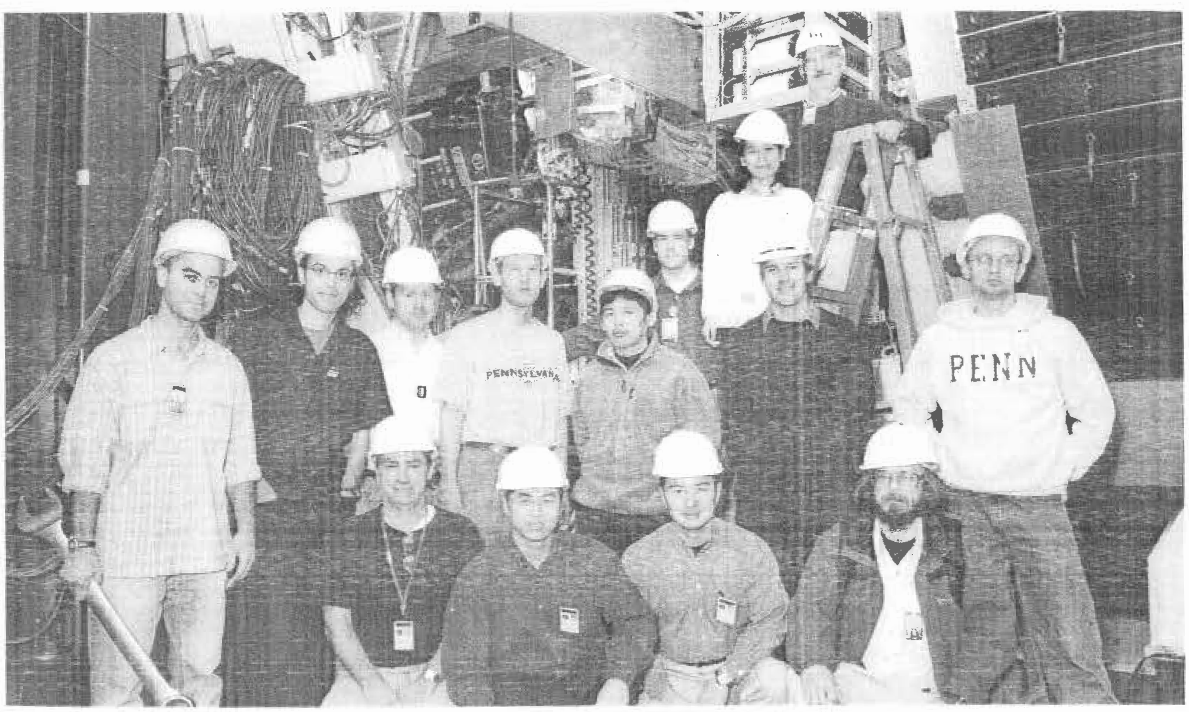
CANADA
McGill University
University of Toronto

ITALY
University of Pisa

JAPAN
Waseda University

**Associate member institution*

Fermilab users from around the world work with the Laboratory's employees to advance the frontiers of particle physics.



FERMILAB

Fermi National Accelerator Laboratory, 30 miles west of Chicago, is a Department of Energy national laboratory with the primary mission of advancing the understanding of the fundamental nature of matter and energy.

Fermilab is the home of the Tevatron, the world's highest-energy particle accelerator. Particle beams circle through a ring of magnets four miles in circumference to generate experimental conditions equivalent to those that existed in the first quadrillionth of a second after the birth of the universe. This capability to recreate the energy levels of the Big Bang places Fermilab at the frontier of global particle physics research, providing leadership and resources for qualified experimenters to conduct basic research at the leading edge of high-energy physics and related disciplines.

Fermilab currently provides research facilities for about 2,500 particle physicists and their students, from 214 institutions in 34 states (plus the Commonwealth of Puerto Rico) and 29 foreign countries. Typically, the U.S. scientists' research is supported by DOE and the National Science Foundation, and in some cases by university funds.

EVOLUTION OF THE LABORATORY

Fermilab began operations in the early 1970s with a single beam of protons directed at a fixed target and has upgraded its capabilities over the years to take successive steps into the interior of the atomic nucleus. The Laboratory's first major upgrade was the development of the Tevatron, the world's first superconducting synchrotron, with beam energies of approximately one TeV or one trillion electron volts. It operated initially in 1983, and in 1989 the National Medal of Technology was awarded to the leaders of its design and construction team. Another vital upgrade enabled the Tevatron to become a collider, accelerating antiprotons as well as protons to TeV energies, in beams traveling in opposite directions, to produce collisions at selected interaction regions. The first proton-antiproton collisions were achieved in 1985, and now two 5,000-ton detectors, CDF and DZero, track and record the subatomic particles that emerge from proton-antiproton collisions. The collaborations that use these detectors announced in March 1995 the discovery of the top quark, a fundamental particle with an electric charge two-thirds that of the electron, and a mass nearly equal to that of an entire atom of gold. In late 1997, the Laboratory ended Tevatron Collider Run I in order to make major improvements to the Fermilab accelerator complex and the two big collider detectors. Meanwhile, the last run of the Tevatron fixed-target program was completed in early 2000.

Fermilab Director Michael Witherell

The Main Injector, completed in 1999, is the new 120 billion electron-volt (GeV) accelerator that serves as an injector to the Tevatron and the driver for the production of the antiprotons collected by the Antiproton Source. With its increased beam intensity, the Main Injector allows Fermilab to increase the rate of antiproton production. The Laboratory will run future fixed-target programs with 120 GeV protons from the Main Injector. The Recycler, a storage ring located in the Main Injector tunnel, will recapture most of the antiprotons that have heretofore been thrown away at the end of each collider store (colliding proton and antiproton beams circulating in opposite directions in the

Fermilab's Wilson Hall is a landmark for both the local neighborhood and the high-energy physics community.

Wilson Hall at twilight.

Fermilab's two collider detectors have reinvented themselves for the new, higher event rate environment of Collider Run II

Tevatron), in order to increase further the number of antiprotons available for colliding beams. All of the accelerator improvements combined are expected to provide a proton-antiproton collision rate ten times that of Collider Run I.

The $260 million Main Injector Project was completed in 1999 on time and under budget, and then began its commissioning phase in support of the 1999 Tevatron fixed-target run. Recycler commissioning is continuing, along with improvements in the rest of the accelerator complex. Technical modifications have been made to the Tevatron to allow 36 bunches of protons and antiprotons to collide, rather than the six bunches of the last collider run. It is planned to use a new experimental hall at the Tevatron's CZero interaction region for BTeV, an experiment dedicated to the physics of the B meson, including an exploration relevant to the matter-antimatter asymmetry in the universe.

Young-Kee Kim, physics professor at University of California, Berkeley, is a member of the CDF collaboration.

Fermilab's two collider detectors have reinvented themselves for the new, higher event rate environment of Collider Run II. The CDF and DZero collaborations began to tear apart their respective detectors after the end of Collider Run I, and then proceeded with a major rebuilding program. Foremost among the challenging schedule issues for both collaborations was delivery of silicon sensors and readout chips for particle tracking. These more sophisticated, more technically agile and more powerful detectors must be ready for the barrage of high-energy collisions created by the Tevatron, which are expected to produce data at the rate of a petabyte (10^{15} bytes) per year. (It would take a billion floppy disks to hold a petabyte of data.) The Run I data total of 40 terabytes ($4x10^{13}$ bytes) per detector will be dwarfed by this prodigious new technological achievement.

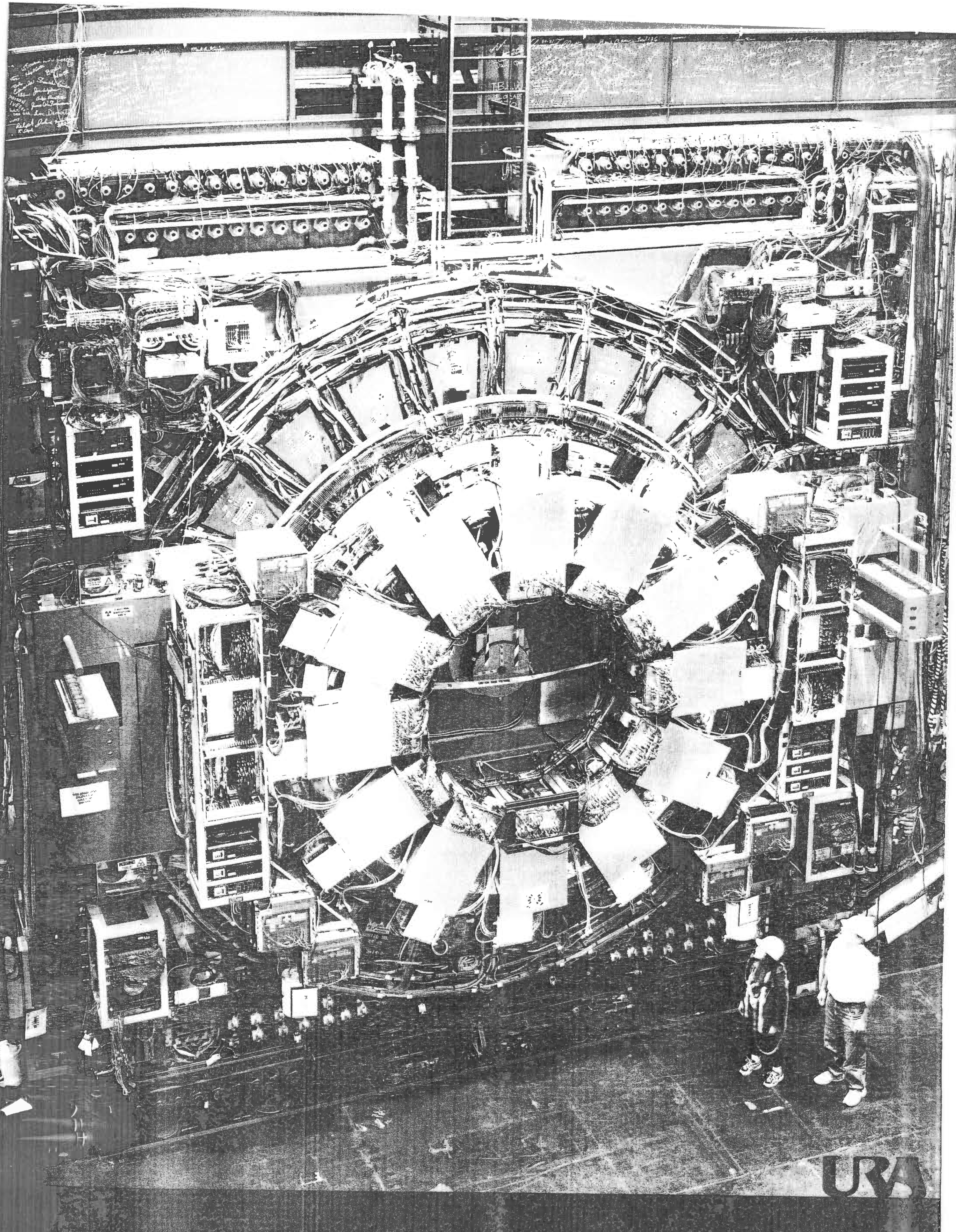
In March 2001, Collider Run II began at Fermilab, and scientists from U.S. universities and others around the world resumed probing the smallest dimensions that humans have ever examined. Experiment collaborations continue to analyze data and uncover new scientific results from preceding collider and fixed target runs. The Laboratory continues to make progress on improving performance of the accelerator complex to achieve Run II goals. The CDF and DZero collaborations are completing the final phases of their current detector upgrade projects for Run II. Construction continues for new neutrino experiments, as does R&D on options for future accelerators. In addition, the Laboratory is moving ahead in its collaborations in three non-accelerator projects at the forefront of research in astrophysics.

THE FERMILAB PROGRAM AND THE FIELD OF PARTICLE PHYSICS

The remarkable progress of particle physics over the past few decades is well known and widely celebrated. The good news about the future is that the prospects for new fundamental discoveries in the next decade are as great as at any time in the history of the field. New experiments will be able to answer questions that have been central to the field for some twenty years:

1. What sets the magic energy scale of about 200 GeV (about equivalent to the mass of one gold atom) that determines so many fundamental characteristics of matter?
2. Is there a new set of supersymmetric particles, one partner for every particle already observed, as one fundamental theory (string theory) predicts? Are there effects of extra space-time dimensions, at this scale?

The upgraded CDF detector just before being rolled into the collision hall in preparation for Collider Run II. The CDF detector subsystems observe 3 million particle collisions per second.

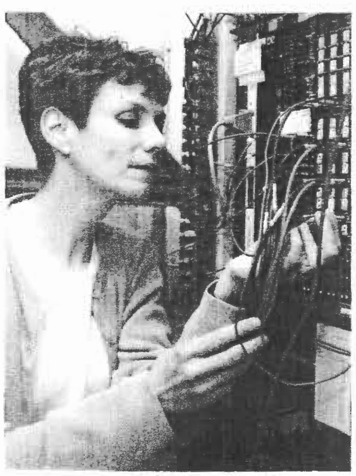


The Fermilab program is addressing important issues with new experiments

3. Does the "Standard Model" of particle physics predict all manifestations of charge-parity (CP) violation, the asymmetry between matter and antimatter (which has allowed matter to predominate over antimatter in the universe).
4. Does the evidence for very small neutrino masses signal some new physical phenomenon at a very high mass scale, beyond that directly accessible in accelerator-based experiments?
5. What is the nature of the dark energy and the dark matter in the universe, and do they include new forms of matter such as supersymmetric particles?

The Fermilab program is addressing all of these important issues with new experiments. The addition to the accelerator complex of the Main Injector has revitalized the experimental program; over the next several years, the Tevatron Collider will be the center of the search for new physics at the highest energy available at any accelerator facility. For example, discovery of the predicted, but as yet unobserved, Higgs boson would lead to an understanding of what determines the masses of the elementary particles.

Fermilab is also developing a superb neutrino program that will contribute essential information on the puzzling question of neutrino masses and oscillations. In addition, the Laboratory is the center of U.S. activity in preparing for the scientific program at the Large Hadron Collider (LHC), now under construction and at CERN, the European Laboratory for Particle Physics in Geneva, Switzerland. The LHC is currently scheduled to begin operations in 2007, and at that time, the high-energy frontier in particle physics will shift to Europe.



Physicist Amber Boehnlein inspects data acquisition circuitry for the DZero detector.

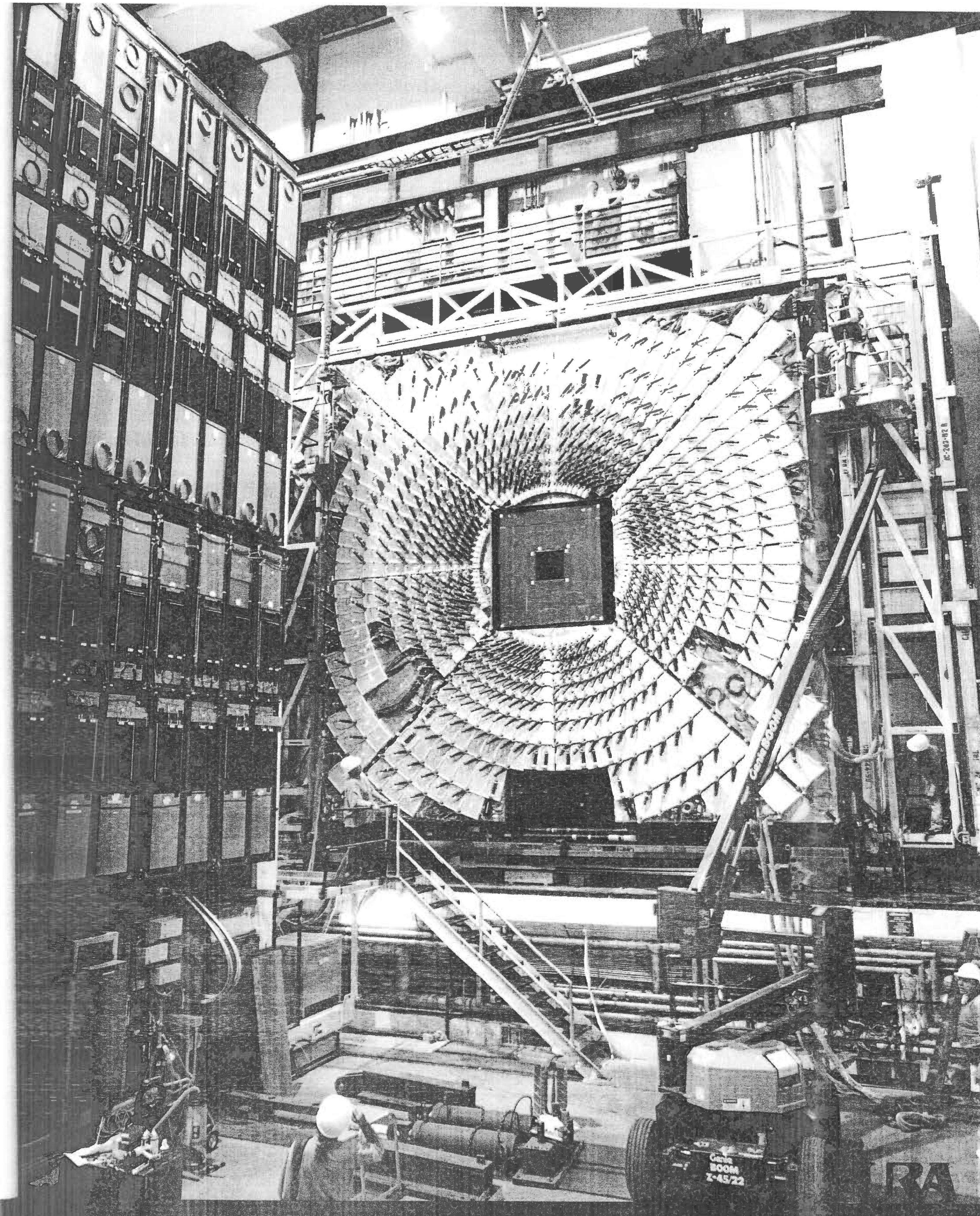
HIGHLIGHTS OF 2001-2002

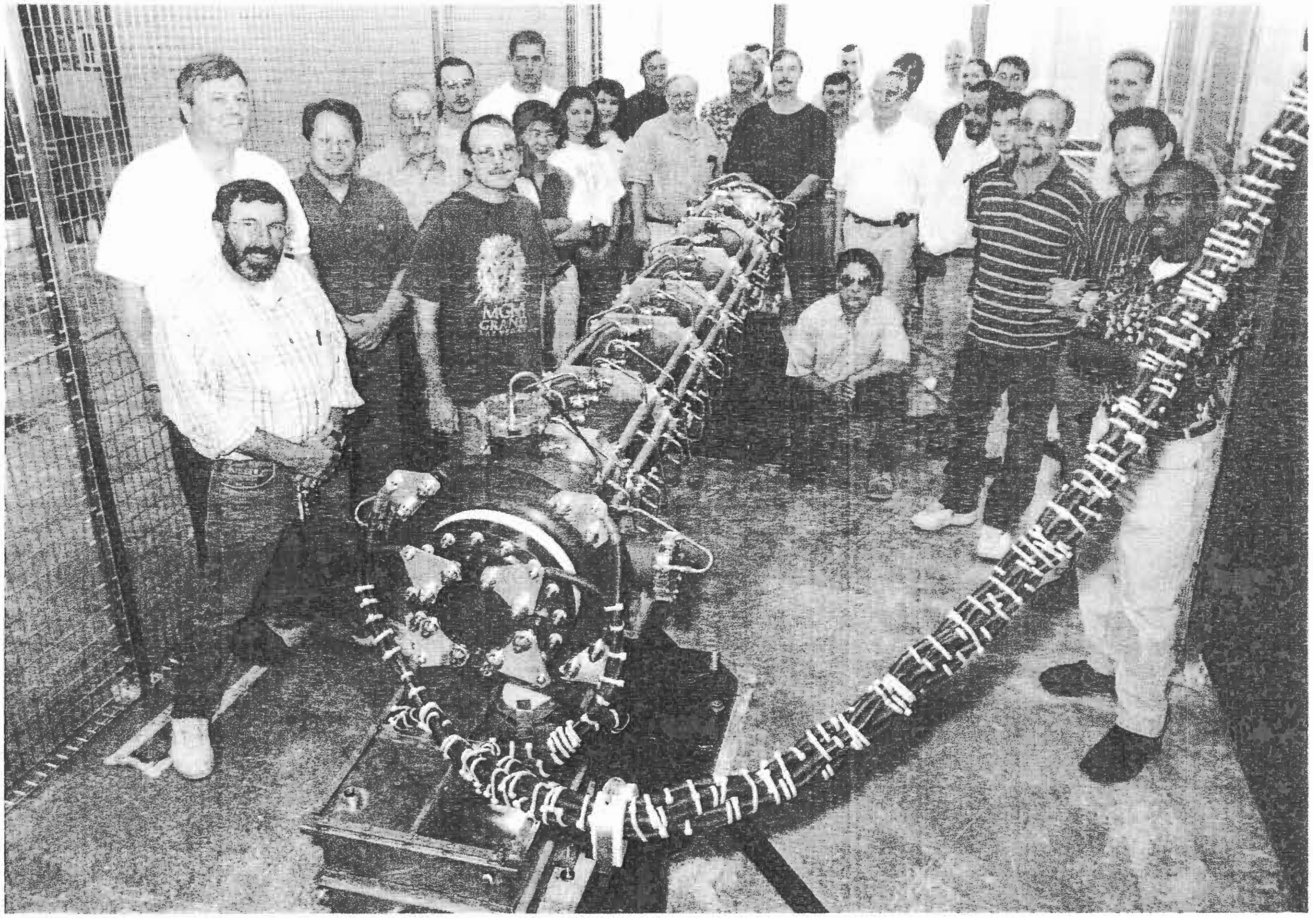
Fermilab has been in a period of intense construction activity as the Laboratory moves into the next phase in the evolution of its science program. Much of Fermilab's accelerator complex is new since the end of Collider Run I in 1997, and the two large collider detectors, CDF and DZero, have been substantially rebuilt. Since the March 1, 2001 start-up for operation of the new Collider complex, the Laboratory has been engaged in the technical challenge of steadily increasing Collider luminosity, a measure of the proton-antiproton collision rate. Although the luminosity has been increasing more slowly than originally planned, a sustained effort is underway to understand problems and implement solutions. Luminosity improvements will be crucial for providing the 1,000 physicists who make up the CDF and DZero collaborations with the quantity of data they require for new discoveries.

In order to make way for LHC construction, CERN management decided to end operations of its LEP electron-positron collider on November 2, 2000. Thus, Fermilab's Tevatron Collider now stands alone at the energy frontier for the next five years, and the CDF and DZero collaborations have an excellent opportunity to discover the Higgs boson, especially if its mass is in the region of 115 GeV as hinted by data from the LEP collaborations. However, such a discovery will require an aggressive program of further upgrades to the accelerator complex and the collider detectors over the next few years.

Most of the Laboratory effort in the past year went into continuing the construction of new experiments and improving the performance of the accelerator complex for Collider Run II, yet the various collaborations of experimenters at Fermilab produced a total of 71 publications based on results from the final 800 GeV fixed-target run and from further analysis of data from Collider Run I. In addition, some 42 Ph.D. candidates completed theses based on research they carried out at Fermilab. These students go on to exciting careers in particle

The 150-ton C-layer muon detection system is a critical component of the DZero detector. Individual detector elements are overlapped to form a continuous plate in a "fish scale" design (background center).





The first of two magnetic focusing devices, called "horns," that align the positively charged particles produced in a target, posed with the team that built it. Current pulses of up to 200,000 amps are applied to the horn for a fraction of a second at the same time as the primary proton beam strikes the target. Such devices shape and direct the secondary particle beams that, in turn, produce the neutrinos for the the MiniBooNE and NuMI/MINOS experiments.

physics, as well as in related fields such as astronomy, computer sciences, and engineering.

The CDF and DZero detector collaborations continued to report more precise measurements, both in support of leading theories and in the search for new phenomena beyond the current Standard Model. Of great interest are recent results from the CDF and KTeV collaborations on the very small asymmetry in the behavior of matter in certain particle interactions, namely meson decays that violate what is called charge-parity or time reversal symmetry. This phenomenon is key to understanding how matter came to predominate over antimatter in our universe, because without it, there would be no stable aggregations of matter in the form of stars, planets and, ultimately, life.

In November 2001, the NuTeV detector collaboration reported results from precise measurements of neutrino behavior that is not predicted by the Standard Model, and which could be a signal of new phenomena. In June 2002, the SELEX detector collaboration reported first evidence of the "doubly-charmed" baryon—a three quark particle like the ordinary proton or neutron—that contains two "charm" quarks. Such exotic baryons are thought not to have existed in nature since the first few moments of the Big Bang.

In August 2001, DOE's Scientific Discovery through Advanced Computing Program (SciDAC) awarded a group of Fermilab physicists and computer scientists $1.28 million a year for three years as participants in three nationwide collaborations for creating computer tools that will allow scientists to work at their home base with up-to-the-second experimental data from sources anywhere in the world; and for adapting those access tools for more efficient design of future accelerators for high energy physics.

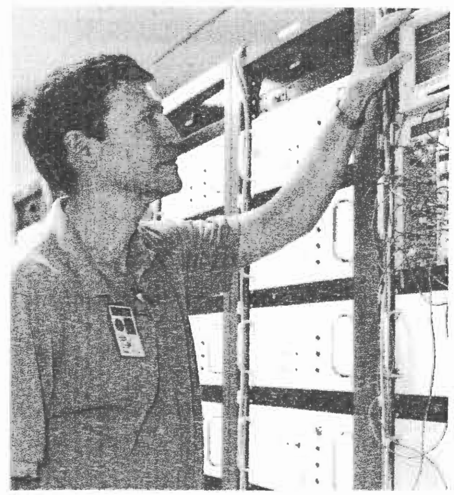
THE NEXT MAJOR NEUTRINO EXPERIMENTS

Two Fermilab experiments will explore the question of whether neutrinos do, in fact, have a small mass. In project NuMI (Neutrinos at the Main Injector), with its associated experiment called Main Injector Oscillation Search (MINOS), Fermilab will use the Main Injector to create a high intensity beam of muon neutrinos aimed first at the "near" MINOS detector, and continuing through the earth to the "far" MINOS detector, deep underground at the Soudan Underground Laboratory, in a former iron mine in northern Minnesota. Should the MINOS experiment reveal that some of the muon neutrinos have changed to tau neutrinos during their 730-kilometer journey from Fermilab to Minnesota, then that change, in conjunction with results from a number of accelerator and non-accelerator experiments around the world, would confirm that neutrinos do indeed have mass. If they do, the implications of such a result will be profound. (Each cubic centimeter of the universe contains more than 100 neutrinos!)

Design and engineering work for the NuMI beamline began in late 1997. Civil construction activities began in 1999, both on the Fermilab site and at Soudan.

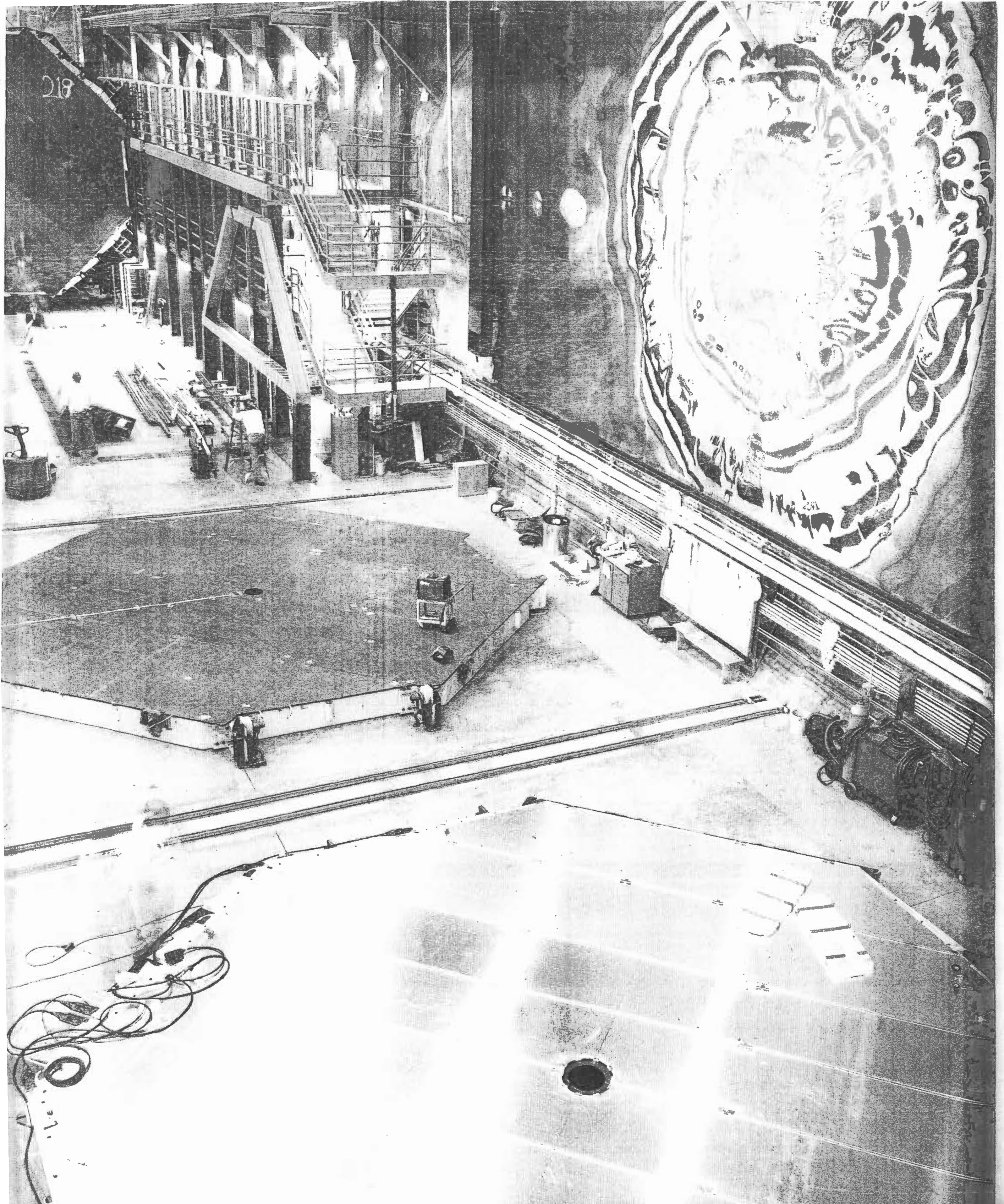
In late 2000, Fermilab managers and NuMI collaborators faced increased project costs and schedule delays, due primarily to challenges associated with beamline technical components and with underground excavation on the Laboratory site. The Laboratory went through extensive restructuring of the NuMI project in 2001, proposing a new baseline for the project cost and schedule. In addition, the Laboratory assigned additional manpower and expertise, and reorganized NuMI/MINOS management to address critical areas of the project. After a series of detailed reviews of the refined cost, schedule and management for NuMI, DOE approved the project baseline changes in December 2001. Excavation of underground enclosures on the Laboratory site, including the near detector hall, is scheduled for completion in 2002. It will be followed by outfitting of the enclosures, construction of the service buildings, and installation of beamline components and the near detector during 2003 and 2004. Meanwhile, the far detector hall in the Soudan mine has been completed, and the first far detector supermodule was operating in July 2002. Data-taking is scheduled to begin with both detectors when neutrino beam commissioning starts in early 2005.

A separate, complementary neutrino experiment, MiniBooNE, will use beam from Fermilab's 8 GeV Booster. The MiniBooNE collaboration will search for the change of muon anti-neutrinos to electron anti-neutrinos, and will provide a definitive answer to questions raised by evidence for such neutrino oscillations in an experiment based at Los Alamos National Laboratory. Construction of the MiniBooNE experiment began in October 1999. Civil construction for the new 8 GeV proton beam facility began in 2000. The detector and beamline components were completed in early 2002. By summer 2002, the Booster was providing proton beam to the detector for commissioning, and the MiniBooNE collaboration was preparing to begin taking physics data.



MiniBooNE cospokesperson Bill Louis, here checking the MiniBooNE data acquisition system, is a scientist at Los Alamos National Laboratory. In the 1990s, he worked on the LSND experiment, which triggered the idea for the MiniBooNE experiment at Fermilab.

Fermilab experiments will explore the question of whether neutrinos do, in fact, have a small mass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The LHC will provide a unique and affordable opportunity for U.S. scientists to continue to work at the energy frontier

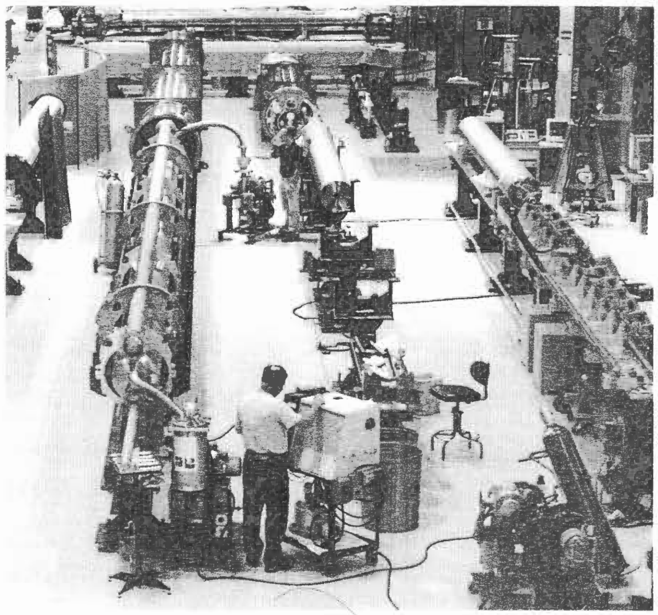
THE LARGE HADRON COLLIDER

As Collider Run II proceeds at Fermilab, the Laboratory also has a significant role in building the collider that will eventually overtake the Tevatron at the energy frontier. Through DOE and NSF, the United States is investing $531 million over eight years in the LHC at CERN and two of its associated detectors. The U.S. is one of several non-CERN member states, including Canada, Japan, India and Russia, contributing to the LHC.

When the LHC begins operating sometime after 2006, it will reach an energy seven times the energy of Fermilab's Tevatron. The LHC will provide a unique and affordable opportunity for U.S. scientists to continue to work at the energy frontier, and it will allow Fermilab to develop the technologies for building the accelerators that will someday surpass the LHC's capabilities.

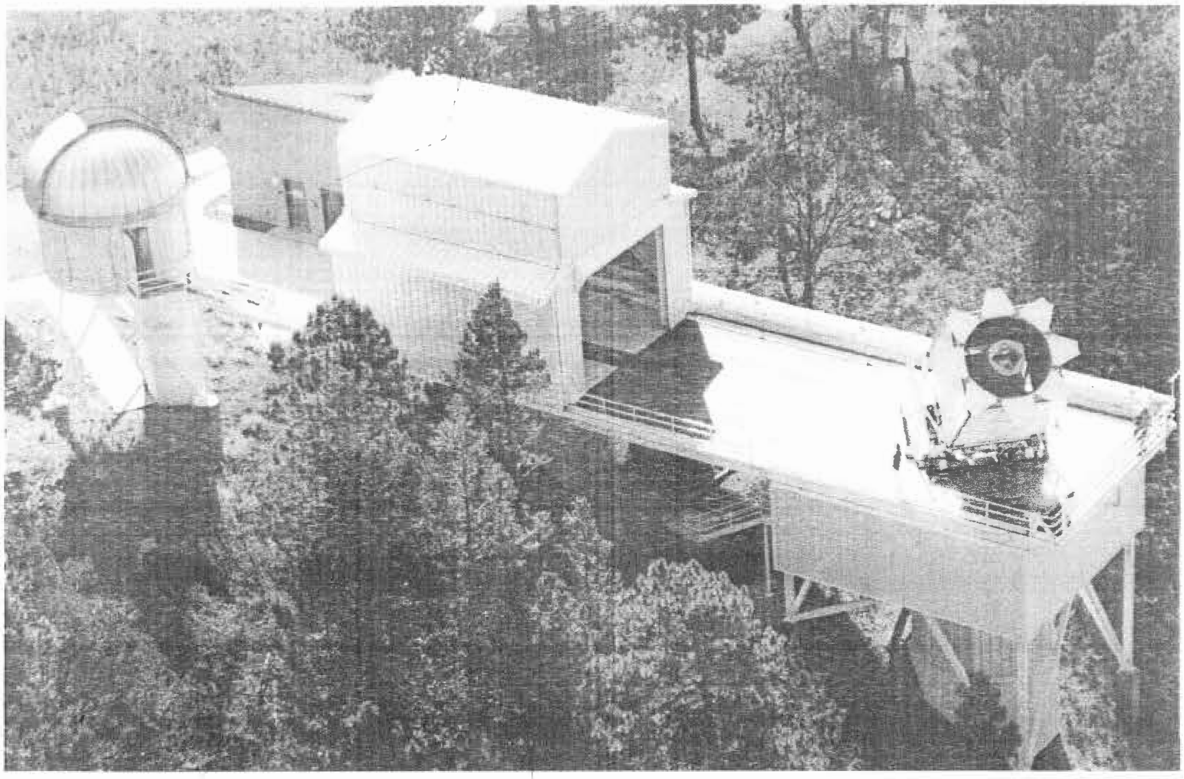
U.S. participation in the LHC has important consequences for Fermilab. The Technical Division's Jim Strait is the project manager for the U.S. contribution to the accelerator, leading a collaboration that includes Fermilab and the Brookhaven and Lawrence Berkeley National Laboratories. Most of the R&D for the advanced superconducting quadrupole magnets for the LHC's interaction regions has been done at Fermilab, and most of the fabrication of these magnets is also taking place at Fermilab. Planning is now taking place for a continuing U.S. LHC Accelerator Research Program, and Fermilab has been appointed a lead laboratory role for this next phase of activities.

DOE and NSF have asked Fermilab to oversee project management for the U.S. contribution to the CMS detector, one of the LHC's two major detectors. Several years ago, the U.S. CMS collaboration asked Fermilab to serve both as one of its collaborating institutions and as its host laboratory, and Fermilab and URA agreed. The collaboration made excellent progress in the past year, and the U.S. CMS construction project continues to be on schedule and on budget. Fermilab has also been chosen to be the major U.S. CMS regional computing center, one of the few such centers around the world. Planning is proceeding for Fermilab's role as host laboratory for the physics research phase of U.S. CMS once the LHC begins operations.



The magnet test area at Fermilab with the first LHC quadrupole-corrector magnet assembly, consisting of two Fermilab quadrupoles and a CERN correction coil. Denny Gaw (foreground) and Jan Szal perform a leak check before the assembly (center left) is inserted into its cryostat vessel (orange cylindrical structure at upper left).

The cavern for the far MINOS detector at the Soudan Underground Laboratory, where nearly half of the projected 486 detector planes have been assembled and installed. The University of Minnesota Foundation commissioned artist Joe Giannetti to paint a mural (upper right) that is 59 feet wide and 25 feet high. Two of the detector planes lie on the floor in preparation for installation in the detector module (upper left).



The Sloan Digital Sky Survey installation at the Apache Point Observatory in Sunspot, New Mexico. The survey's 2.5 meter telescope is seen at the right in this aerial view of the site.

ASTROPHYSICS

All of the proposals for extending the domain of validity of the Standard Model of particle interactions predict new particles. If these particles are stable, then large numbers of them will have survived the moment of creation and will still be present. Should that be the case, they could make up a significant fraction of the mass of the universe. Searches for these massive particles of "cold dark matter" are underway. Fermilab is a member of the collaboration of twelve institutions in the Cryogenic Dark Matter Search (CDMS). These collaborators have developed very sensitive detectors, made of germanium or silicon, that can detect the recoils of germanium or silicon nuclei if they collide with one of these massive particles. The CDMS collaboration has recently made public the most sensitive limits on such dark matter on the basis of the preliminary experiment at a shallow underground site on the Stanford University campus. Fermilab now has the project management responsibility for building a larger and more sensitive experiment, CDMS II, in the same Soudan Underground Laboratory that houses the far MINOS detector. Fermilab is also contributing to the electronics, data acquisition, and cryogenics systems for CDMS II. All support systems are expected to be installed for commissioning at Soudan by summer 2002, together with initial running of the first of five detector towers.

Fermilab is also engaged in a collaboration that aims to find out how matter, both dark and luminous, is distributed. This project, the Sloan Digital Sky Survey (SDSS) is mapping in detail one-quarter of the entire sky, determining the positions, absolute brightnesses, and red shifts of more than 100 million celestial objects, including more than a million galaxies and a hundred thousand quasars. Among Fermilab's many contributions to this project is the construction of the data acquisition system and the software and hardware to process the expected 10 to 20 terabytes of data that will be accumulated during the roughly five-year span of the survey. The SDSS collaboration, comprising twelve institutions, has built a 2.5-meter telescope and the associated instruments at Apache Point,

Fermilab is also engaged in a collaboration that aims to find out how matter, both dark and luminous, is distributed.

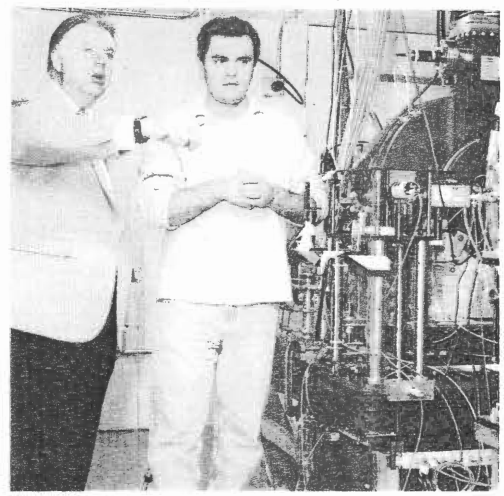
New Mexico. Fermilab Director Emeritus John Peoples serves as the Director of SDSS. Recent scientific results include the discovery of the most distant quasars, clear detection of gravitational lensing of distant galaxy images by foreground galaxies, discovery of two "methane dwarfs," objects with masses intermediate between giant planets like Jupiter and the least massive stars, and closer to home, a catalog of asteroids with the potential to affect Earth.

In June 2001, SDSS announced an "Early Data Release" (EDR) consisting of images, spectra and measured parameters obtained during the commissioning phase and since the start of routine observations on April 1, 2001. Fermilab and the Space Telescope Science Institute are providing the websites to distribute the EDR to the astronomical community. In November 2001, the SDSS collaboration reported the first optical observation of a gamma ray burst afterglow, unprompted by prior observation of the burst itself from orbiting satellite detectors. In June 2002, a team of SDSS scientists reported the discovery of a spectacular stream of stellar debris emanating from a star cluster that is being torn apart by the tidal forces of our Milky Way Galaxy. Researchers say that such extended debris steams provide a new way to determine the distribution of the Galaxy's dark matter halo. In 2001, a collaboration of five scientific institutions including Fermilab submitted a proposal to NASA for a small explorer satellite called PRIME (for Primeval Explorer) that would extend SDSS studies to higher redshifts by conducting an infrared survey of one-quarter of the sky.

As a member of an international collaboration of 15 countries, Fermilab is playing a major role in the Pierre Auger Observatory Project, which will explore the properties and mysterious origins of very-high-energy cosmic rays. (*See Separate Section on Pierre Auger Observatory Project.*)

FUTURE ACCELERATORS AND COLLIDERS

While scientists await new discoveries from Collider Run II at Fermilab, and later in the decade from the LHC at CERN, they must also plan how to advance the field in the future. For this it is necessary to perform R&D for the next generation of major accelerator facilities. Many in the community believe that Fermilab is the natural site for such a facility. As the largest U. S. laboratory for particle physics, Fermilab would provide a strong base of talent and infrastructure on which to build new facilities, both on and near the present site. Future accelerator and collider concepts currently under study include a 500-1000 GeV electron-positron linear collider, a muon storage ring-based "neutrino factory," and a 100-200 TeV very large hadron collider. Fermilab scientists have been engaged in R&D in support of all three concepts.



Northern Illinois University President John Peters (left) visiting the Fermilab/NICADD Photoinjector laboratory, a research beamline facility at Fermilab.

The electron-positron linear collider option is receiving the most focused effort around the world. Its proponents see it as a natural complement to the LHC in exploring new physics at the TeV mass scale. In a much anticipated January 2002 report, a DOE/NSF advisory panel on Long Range Planning for U.S. high-energy physics recommended that "the highest priority of the U.S. program be a high-energy, high-luminosity, electron-positron linear

As the largest U.S. laboratory for particle physics, Fermilab would provide a strong base on which to build new facilities

collider, wherever it is built in the world." Fermilab Director Michael Witherell is a member of both the U.S. Linear Collider Steering Committee, and an international linear collider working group under the International Committee for Future Accelerators (ICFA).

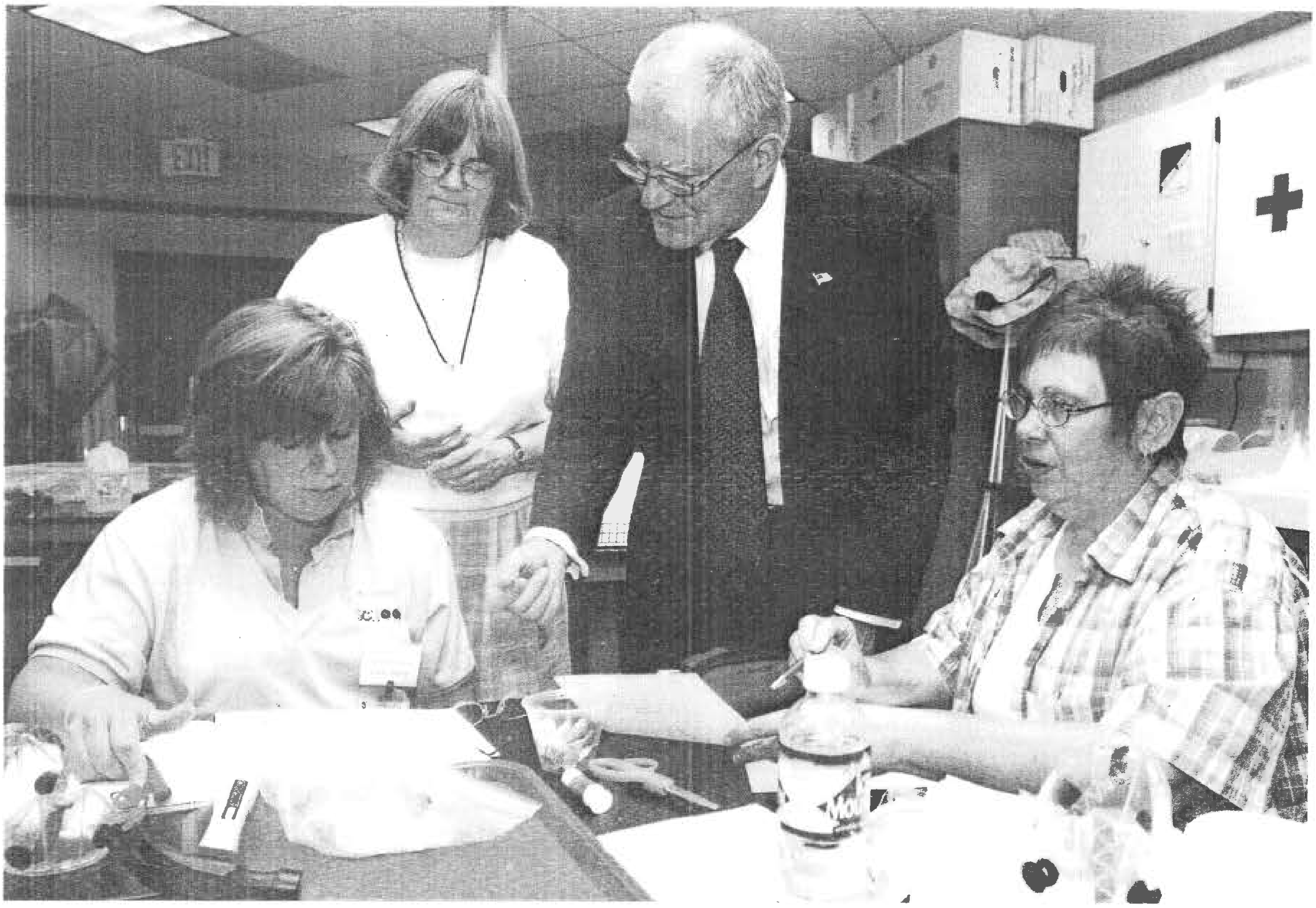
Fermilab is a member of the U.S. Next Linear Collider (NLC) collaboration, which includes Stanford Linear Accelerator Center (SLAC) and the Lawrence Berkeley and Lawrence Livermore National Laboratories. The NLC collaboration has formulated a 4-5 year R&D plan that if brought to a successful completion could support the construction of a linear collider. Major components of the Fermilab NLC R&D program include structures fabrication, an engineering test facility for the main linac, accelerator physics, permanent magnets, and analysis of nearby sites. In addition, Fermilab continues its collaboration with DESY, the German high energy physics laboratory near Hamburg, and other institutions on R&D for the "TeV Energy Superconducting Linear Accelerator" (TESLA), which uses superconducting technology to accelerate particles in contrast to the more "conventional" accelerating technology of the NLC. Fermilab has contributed critical components for the TESLA Test Facility, used to develop and test the new superconducting technology.

Technician Tina Kelly working on a component for the CMS detector.

With high interest in neutrino physics, very intense neutrino sources are required for the next generation of experiments. Current accelerator sources at Fermilab produce secondary beams of neutrinos from collisions of high energy protons on stationary targets. A much more intense neutrino source could be formed using a muon storage ring. The collaboration analyzing this concept encompasses a number of laboratories and universities, with Fermilab and the Brookhaven and Lawrence Berkeley National Laboratories as lead laboratories. At this early stage, R&D is being performed on technical components for a muon cooling experiment to be located at Fermilab.

The very large hadron collider (VLHC) option, a proton-proton collider with a center-of-mass energy of 175 TeV, would provide a "mass reach" for exploration more than ten times greater than that of the LHC. Fermilab's leadership in developing superconducting magnets and the unique advantages of an Illinois site for such a machine make the Laboratory a natural center for R&D toward a VLHC. Fermilab is collaborating with the Lawrence Berkeley and Brookhaven National Laboratories on a VLHC program focused on superconducting magnet R&D, conceptualization of staging scenarios, and tunneling and geological investigations. The Laboratory is currently pursuing R&D on reducing the cost of a VLHC based primarily on high-field (10-12 Tesla) superconducting magnets. The VLHC collaboration has recently focused on a staged approach, in which a 40 TeV machine is built first, and subsequently upgraded to 175 TeV.

Fermilab is also collaborating with several regional universities that have initiated accelerator R&D efforts utilizing both State and Federal support. The Illinois Consortium for Accelerator Research (ICAR) consists of Illinois Institute of Technology, Northern Illinois University, Northwestern University, University of Chicago and University of Illinois, Urbana-Champaign. Supported at $2.5 million per year, the purpose of ICAR is to assist Fermilab with accelerator R&D for future facilities. On March 7, 2001, Speaker of the U.S. House of Representatives Dennis Hastert



Director of the Office of Science and Technology Policy John Marburger and Marge Bardeen (standing, left), head of Fermilab's Education Office, confer with local teachers undergoing training at the Leon Lederman Science Education Center.

announced a Congressional appropriation of $4.2 million to establish the Northern Illinois Center for Accelerator and Detector Development (NICADD). The Center is expected to be operational in 2002 at Northern Illinois University's DeKalb campus. NICADD projects envisioned for collaboration with Fermilab include creation of a particle detector research facility, establishment of a separate facility for development of the next generation of linear colliders, and joint operation of the Fermilab/NICADD Photoinjector Laboratory (FNPL), a research beamline facility at Fermilab. In support of longer range opportunities, Fermilab has undertaken a number of design studies based on different technologies for a Proton Driver, a new generation of high-intensity proton accelerators. The Proton Driver represents an option for future development of the Fermilab accelerator complex in the event that a linear collider is not built in the vicinity of the Laboratory.

EDUCATION, TRAINING AND FELLOWSHIP PROGRAMS

Fermilab's history of achievement in science education and teacher training programs is a tribute to physicists' love of learning and to students' responsiveness to real-world situations. Spearheaded by Fermilab Director Emeritus and Nobel laureate Leon Lederman, the education program gives special emphasis throughout to strengthening science education for under-represented groups.

The Leon M. Lederman Science Education Center, dedicated in 1992, drew attendance in 2001 of over 24,000 students and 6,500 teachers in K-12 education programs. The Center offers some 25 programs: teacher enhancement workshops and institutes, opportunities for research participation, development and distribution of instructional materials, a collection of teachers' resources,

Fermilab has been designated a National Environmental Research Park by the Department of Energy

Laboratory tours, special events, class field trips, and science shows. In 2001, the Center's education webserver received over 4,700,000 hits. Currently, 80 percent of the Center's funding is provided by Fermilab, and 20 percent comes from other federal, state and private sources.

The Summer Internships in Science and Technology (SIST) program provides summer internships at Fermilab in physics, engineering and computer science to an average of 20 undergraduate students per year from minority groups traditionally under-represented in the fields of science and engineering. Fermilab has sponsored the SIST program for 30 years. SIST has the distinction of being the oldest operating program of its type in the U.S. and has served as a model for other laboratories and private industry.

Natalia Kuznetsova comes to Fermilab and CDF from the Stanford Linear Accelerator Center on a three-year Lederman Fellowship. She received her Ph.D. from the University of California at Santa Barbara.

URA also provides financial support for graduate courses at Fermilab. Students must devote so much time to participating in experiments at the Laboratory that they often have difficulty taking needed classes at their home institutions.

Fermilab sponsors the Lederman, Peoples and Wilson postdoctoral fellowships at the Laboratory, and participates in a Joint University-Fermilab Doctoral Program in Accelerator Physics. In collaboration with other laboratories and U.S. universities, Fermilab serves as home of the U.S. Particle Accelerator School. The Laboratory also supports university faculty members through a guest scientist program and as visitors to the Theory Group.

ENVIRONMENTAL ACTIVITIES

In addition to its research in high-energy physics, Fermilab has been designated a National Environmental Research Park by DOE. The Laboratory vigilantly oversees restoration and preservation of the site's ecosystems. Over the years, the Laboratory has restored more than a thousand acres of the native tallgrass prairie that once covered the Fermilab site. The prairie is actively managed, including annual prairie burns to help maintain the system's natural cycles. In 1998, Fermilab became a member of Chicago Wilderness, a consortium of nearly one hundred public and private landholders in the Chicago area committed to careful and responsible management of the remaining habitat in the region.

In 2001, the Illinois Environmental Protection Agency (IEPA) approved a supplemental investigation report for the last of the open solid waste management units currently located at Fermilab. All such units have now been characterized and have been deemed to pose no adverse threat to health or the environment. In addition, an EPA-approved plan to remediate PCB-contaminated soil at twenty-four transformer sites located at service buildings around the four-mile Tevatron ring was completed. Also, added measures to control suspended solids in surface discharge water from the NuMI deep tunnel excavation, which had been problematic, were successfully implemented.

In 2001, the recovery and restoration plan to revitalize previously unusable experimental areas continued. Removal of over five million pounds of material (primarily steel of which 83% was recycled or reused) occurred in one of the experimental halls of the fixed-target beamline area. The newly available space will be used for storage of items previously stockpiled offsite in a rented warehouse. Overall, Fermilab had ten pollution prevention projects that were implemented throughout the Laboratory site.

Wilson Hall in the distance among prairie flowers. The prairie on the Fermilab site is actively managed to help maintain the ecosystem's natural cycles.

A study conducted in May 2001 showed a substantial recovery in the forest vegetation, along with fewer signs of deer browse damage, as a result of the first two years of the Laboratory's deer reduction program. The study recommended that efforts to manage Fermilab's deer population should continue to ensure the protection of plant communities, especially in wooded areas.

TECHNOLOGY TRANSFER

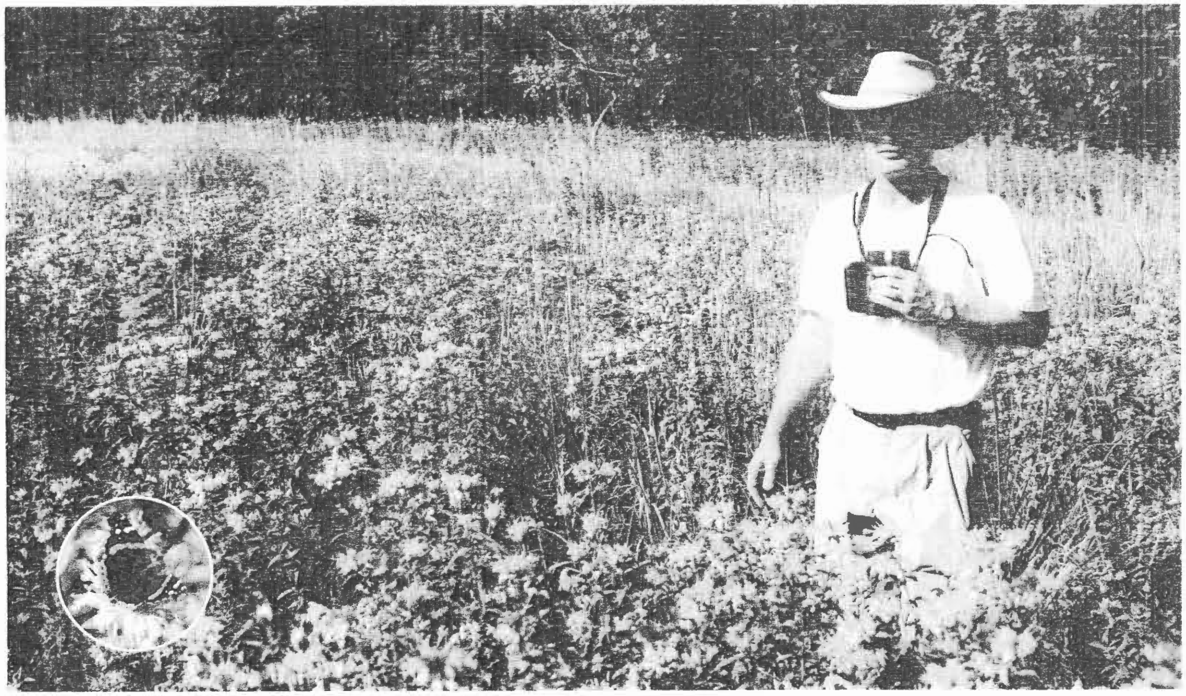
While Fermilab is dedicated to basic physics research, the Laboratory is eager to share its science, technology and know-how by working cooperatively with U.S. industry to encourage economic development. Fermilab has unique capabilities in designing and operating accelerators, managing very large cryogenic systems, developing and operating fast electronics, creating hardware architectures and software for massively parallel computing systems and operating industrial-scale applications of superconducting technology. Sometimes advances in these technologies at the Laboratory have applications beyond high-energy physics research, and Fermilab can transfer new technology to industry to foster economic development. Fermilab's Directorate-level Office of Research and Technology Applications (ORTA) facilitates the transfer of technologies developed at the Laboratory.

ACCELERATORS IN MEDICINE

Between 1976 and 1985, the National Cancer Institute funded clinical trials at Fermilab to explore the effectiveness of fast neutrons versus photon therapy in the management of radioresistant tumors. Over 2,600 patients have received treatment at Fermilab's Neutron Therapy Facility (NTF). About 25 percent of these patients reside outside Illinois, including individuals from Canada, Greece, Haiti, Mexico, Pakistan and the Philippines. Since 1995 the facility has been operated under contract with Provena Saint Joseph Hospital of Elgin, Illinois.

Beyond the borders of Illinois, the NTF has served as a model for more recently built neutron therapy facilities in Michigan, South Africa, and France. Fermilab also built a 250 MeV proton accelerator for the hospital of Loma Linda University Medical Center in California, which began treating patients in October 1990.

Fermilab laboratory staff volunteer in sponsorship of cultural activities and conduct tours for visitors



Senior cryogenic engineer Tom Peterson, with a life long interest in butterflies, leads lunchtime butterfly walks on the Fermilab site, which has hosted at least 44 species of butterflies during the past several years. One of the colorful species appears in the inset at the lower left.

COMMUNITY PROGRAMS

Fermilab's role as a key element of the Illinois High Technology Corridor is complemented by its sponsorship of cultural activities to which the public is invited. Laboratory staff volunteer in supporting an arts series, physics colloquia, films and an art gallery. Fermilab also conducts public tours for visitors and briefings for local citizens on Laboratory initiatives. With the cooperation of DOE security officials, the Laboratory has been pleased to be able to continue most of its public events and guided tours in the wake of post-9/11 security concerns at Federal facilities.

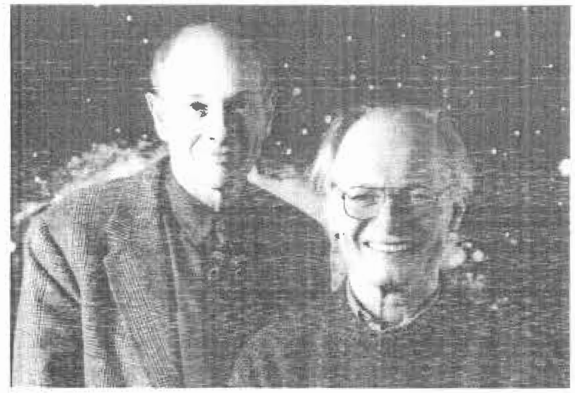
For further information about Fermilab, visit the Laboratory's website at http://www.fnal.gov.

LABORATORY DIRECTORS

On March 5, 1999, URA announced the appointment of Michael Witherell as Fermilab's fourth director, effective July 1, 1999. Dr. Witherell succeeded John Peoples Jr., who led the Laboratory from 1989 to 1999. Dr. Peoples continues at Fermilab as a senior scientist and Director of the Sloan Digital Sky Survey. Leon M. Lederman, a 1988 Nobel laureate, directed the Laboratory from 1979 to 1989 and is a member of the URA Board of Trustees. Dr. Lederman is currently Resident Scholar at the Illinois Mathematics and Science Academy; his contributions to science education are known worldwide. Fermilab's founding director, the late Robert R. Wilson, served from 1968 to 1978, and subsequently served as a member of URA's Fermilab Board of Overseers. Dr. Wilson provided continuing guidance for the aesthetics of buildings and grounds, including sculpture that he created.

Computer specialist Don Holmgren (left) gives theorist Paul Mackenzie a tour of the new SGI commodity computers, which form part of a large cluster for parallel computing. Applications will include computer simulations of quark-quark interactions.

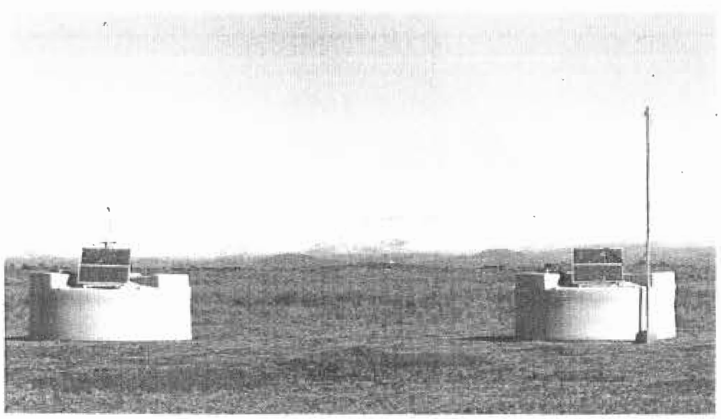
PIERRE AUGER OBSERVATORY PROJECT



James W. Cronin (left) of the University of Chicago and Alan A. Watson of the University of Leeds are co-founders of the Pierre Auger Observatory Project.

Cosmic rays are high-energy particles from space—either electrons or the nuclei of atoms—that constantly bombard the Earth from all directions. The majority are single protons—the nuclei of hydrogen atoms—but some are much heavier, ranging up to the nuclei of lead atoms. A small fraction of cosmic rays are the most energetic particles ever observed in nature. Sources of specific cosmic rays are determined by measuring the energy and direction of the particles as they arrive from space. Direct measurement requires locating detectors above most of the Earth's atmosphere, using high-altitude balloons and orbiting satellites. Cosmic rays can also be detected indirectly on the surface of the Earth by observing the showers of secondary particles they produce when colliding with atmospheric molecules, as discovered by French physicist Pierre Auger about 60 years ago.

The Pierre Auger Observatory Project is a broad-based international effort to make a detailed study of ultrahigh-energy cosmic rays (about 10^{20} eV, or 100 million times greater than the energy of the protons accelerated by Fermilab's Tevatron). The Project was initiated by Dr. James W. Cronin, Professor of Physics and Nobel Laureate at the University of Chicago. Currently, the co-spokespersons for the Pierre Auger collaboration are Dr. Alan A. Watson, Professor of Physics at the University of Leeds in the United Kingdom, and Dr. Hans Bluemer, Director of the Institute for Nuclear Physics at Forschungszentrum Karlsruhe in Germany. Thus far, the collaboration includes over 250 scientists from Argentina, Armenia, Australia, Bolivia, Brazil, China, France, Germany, Greece, Italy, Japan, Mexico, Poland, Russia, Slovenia, United Kingdom, U.S.A. and Vietnam. The U.S. collaboration comprises nine universities plus Fermilab, home of the project manager, Dr. Paul Mantsch.



A few of the 1,600 particle detectors used by the Pierre Auger Cosmic Ray Observatory, positioned in the thousand square mile expanse of the Pampa Amarilla desert at the foot of the Andes, in Argentina. The detectors will study air showers, to probe the origin of ultra-high-energy cosmic rays.

Because the highest-energy cosmic ray events are comparatively rare, scientists must cast a very large "net" to detect even a few. The Pierre Auger Observatory will be the first to combine two different methods for the detection of cosmic ray events in a hybrid approach: surface detector arrays to record the showers of particles produced when cosmic rays strike the earth's atmosphere; and fluorescence detectors to observe the atmospheric flares produced during the air showers. The Observatory will consist of two giant surface arrays, each consisting of 1600 particle detector stations spaced 1.5 kilometers apart and covering about 3000 square kilometers, an area about the size of the state of Rhode Island. In order to get a complete view of the heavens as seen from the earth, one array will be located in the northern hemisphere and one in the southern hemisphere. In November 1995, the collaboration selected a site in the Province of Mendoza, Argentina for the southern hemisphere array, and in September 1996 a site in

In order to get a complete view of the heavens as seen from the earth, one array would be located in the northern hemisphere and one in the southern hemisphere

Millard County, Utah for the northern hemisphere array. The total project cost is approximately $100 million.

In a grant to URA on behalf of the U.S. Project participants under Dr. Cronin's continuing leadership, the National Science Foundation and the Department of Energy are providing $7.5 million over four years toward the U.S. share for the construction of the southern hemisphere array. This is planned to be followed by construction of the northern hemisphere array.

URA serves as the sponsoring organization for the U.S. participants, and as such oversees those activities currently funded by the U.S., such as component R&D and production. In the future, URA would have a similar role for the Utah site. In addition, DOE and NSF have designated URA to be the agent on behalf of the U.S. on the Project's international oversight board.

In March 1999, an international agreement was signed in Argentina for the organization, management and funding of the Pierre Auger Observatory, and the southern hemisphere site was inaugurated at Malargue in Mendoza Province. In November 2000, construction was completed for the Detector Assembly Building at the Central Campus in Malargue and for the first fluorescence detector building. In December 2000, the project received a gift of $1 million from the University of Chicago for the construction of the Central Campus Office Building. The "Engineering Array," which consists of forty surface detector stations and a fluorescence detector telescope unit, was deployed in 2001, and in March 2002 a four-month test run was completed, in which 70 "hybrid" surface-fluorescence events were collected. With the experience gained from the engineering array, construction of the entire southern hemisphere array is now underway.

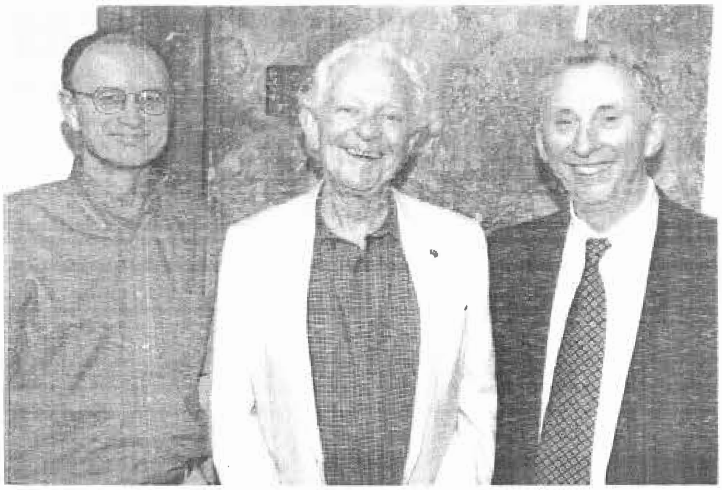
There is great interest in the mysterious origin of the ultra-high energy cosmic rays that the Observatory will be analyzing. Theorists have suggested such candidate sources as the black hole cores of quasars, ultra-magnetic neutron stars, and super-heavy dark matter clumps. As a measure of the scientific importance attached to the Observatory, a 2002 report of the National Research Council's Committee on the Physics of the Universe recommends "that the United States ensure the timely completion of the Southern Auger array."

The new Auger Center building houses offices and the data acquisition center. The Pierre Auger Observatory Project headquarters is in this building at the Southern Hemisphere site in Malargue, Argentina.

FUTURE URA ENTERPRISES

URA has a broad charter for the management of research and educational activities in the natural sciences. The Corporation has been engaged in long-range planning to explore potential new management responsibilities that would be of value to the university research community. As part of this planning, URA has been considering bids on management contracts for selected national research centers and facilities that serve a broad base of national and international users.

HISTORY 1965 - 2001

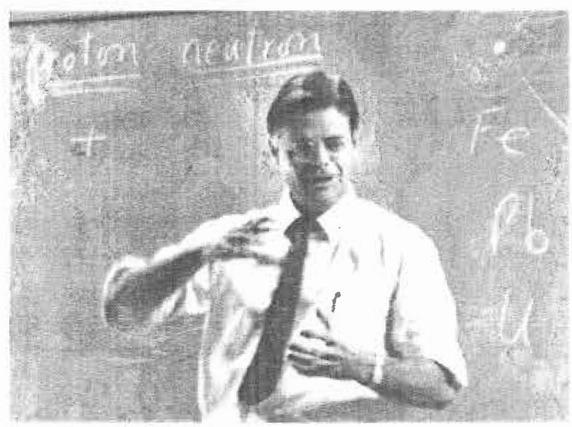


Current Fermilab Director Michael Witherell (left) along with previous lab director John Peoples Jr. (1989-1999, right), congratulate Leon M. Lederman, (lab director from 1979 to 1989), at his 80th birthday party.

The creation of URA marked a milestone in government-university cooperation for the management of federal laboratories. Until 1965, individual universities and regional consortia had built and operated facilities under federal sponsorship. It was the unique character of particle physics research—which often involved collaborations among scientists from many institutions—that created the need to establish a truly national management organization. The federal government consulted with the National Academy of Sciences on how to accomplish this goal. The President of the Academy then convened the presidents of the U.S. universities engaged in particle physics, to consider management options for national facilities. Following that meeting, 25 attendees agreed to form a consortium leading to the incorporation of URA.

This concept of fully national, and now increasingly international, cooperative efforts between the federal government and research universities was developed to address the needs of many fields of science. Since 1967 URA has been contractor to the Department of Energy and its predecessor agencies for the design, construction, management, and operation of Fermilab. URA's success in building and operating Fermilab led to its selection as contractor for the nation's next major particle accelerator, the SSC. After the project was canceled in 1993, URA managers and staff assisted with the termination activities, which were essentially concluded by the end of 1996.

Currently, the Fermilab program and its associated scientific and technological enterprises, and U.S. participation in the Pierre Auger Observatory Project represent the core of URA's mission. As appropriate opportunities arise, the corporation will consider submitting proposals to the federal government, or elsewhere, for the management and operation of other facilities and programs in science and engineering.



Fermilab founding director Robert Rathbun Wilson.

The creation of URA marked a milestone in government-university cooperation for the management of federal laboratories.

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Pierre Auger Observatory Project

James W. Cronin
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U.S. Principal Investigator

CORPORATE STRUCTURE

MEMBERSHIP AND GOVERNANCE

As a non-profit corporation, URA acts under the authority of its governing body, the Council of Presidents of its 90 member universities. The Council is analogous to the shareholders of a public corporation. A Board of Trustees, elected by the Council, has the fiduciary responsibilities for the corporation and deals with corporate policy and planning issues. The Trustees appoint boards of overseers for each URA research enterprise. The headquarters office of URA in Washington, D.C. coordinates the activities of the Council and boards, and is responsible for oversight and governance of Fermilab and for corporate relations with the federal government, industry, academe, and the general public. The Internal Audit Manager for Fermilab reports to the URA Headquarters Office.

The Fermilab Director is selected by the Board of Trustees with the approval of DOE. Daily operations are coordinated directly between Laboratory management and the DOE Chicago Operations Office or DOE headquarters. The total number of URA employees at corporate headquarters and at Fermilab is now about 2,210.

URA member universities are divided among seven geographic regions within the United States to ensure that the boards reflect the organization's national character. URA has expanded these regions to include its international members. The Council of Presidents elects one Trustee from each of the seven regions; each Regional Trustee is president or equivalent chief executive officer of a member institution in the region. There are up to nine At-Large Trustees. Similarly, there are seven regional members and up to eleven at-large members of a board of overseers.

URA board members over the years have included university presidents, chief corporate executive officers, Nobel laureates, and directors of other major research laboratories. Regional group secretaries, who are faculty members at URA member universities, help to identify candidates for election to the boards of overseers.

"Tractricious" is a free-standing hyperboloid sculpture, located in front of Fermilab's Industrial Center Building. It was made from unused stainless steel beam pipe, by founding Director Robert Wilson.

In lieu of annual dues, URA may assess its member universities as special needs arise. Since the formation of the corporation in 1965, assessments have totaled $30,000 per member. Newly elected members are assessed the amount of the most recent prior assessment.

HEADQUARTERS OFFICE

Corporate officers include leaders of the URA governing bodies (Council of Presidents and Board of Trustees) and executive officers at URA headquarters in Washington, D.C. Headquarters officers are the President, Vice President/Secretary, Chief Financial Officer/Treasurer, and General Counsel.

REGIONAL GROUP SECRETARIES

1 **Kam-Biu Luk,** University of California, Berkeley
2 **Kenneth J. Heller,** University of Minnesota
3 **Sally C. Seidel,** University of New Mexico
4 **Randal C. Ruchti,** University of Notre Dame
5 **Paul D. Sheldon,** Vanderbilt University
6 **Bruce A. Barnett,** Johns Hopkins University
7 **Michael Tuts,** Columbia University

URA BOARD OF TRUSTEES

FERMILAB BOARD OF OVERSEERS

REGIONAL OVERSEERS — Term Expires

REGION

1 Benjamin Shen 2003
Professor, University of California, Riverside

2 Gregory Snow 2004
Assoc. Professor, University of Nebraska, Lincoln

3 Marjorie Corcoran 2004
Professor, Rice University

4 Melvyn Shochet 2005
Professor, University of Chicago

5 Thomas Weiler 2004
Professor, Vanderbilt University

6 Donald Hartill 2004
Professor, Cornell University

7 Frank Sciulli 2005
Professor, Columbia University

OVERSEERS AT-LARGE — Term Expires

Jonathan Bagger 2003
Professor, Johns Hopkins University

John Boright 2004
Executive Director, Office of International Affairs, National Academy of Sciences

Mark Bregman 2005
Executive Vice President, Product Operations, Veritas Software

France Cordova 2003
Vice Chancellor, Research, and Professor, University of California, Santa Barbara

Jerome Friedman 2004
Professor, Massachusetts Institute of Technology

Paul Grannis 2004
Professor, State University of New York-Stony Brook

Peter Koehler 2003
Professor, University of Pittsburgh

Maxine Savitz 2005
General Manager (ret.), Honeywell Technology Partnerships

Allen Sessoms 2005
Visiting Scholar, John F. Kennedy School of Government, Harvard University

David Shirley 2003
Director Emeritus, Lawrence Berkeley National Laboratory

Jill Wittels 2005
Vice President, Business Development, L-3 Communications

FERMILAB BOARD OF OVERSEERS ORGANIZATION

CHAIR
David Shirley

VICE CHAIR
Donald Hartill

EXECUTIVE COMMITTEE
David Shirley, Chair
Marjorie Corcoran
Paul Grannis
Donald Hartill
Peter Koehler
Jill Wittels

ADMINISTRATIVE COMMITTEE
Jill Wittels, Chair
Mark Bregman
Peter Koehler
Allen Sessoms

AUDIT COMMITTEE
Peter Koehler, Chair
Mark Bregman
Jill Wittels

ENVIRONMENT, SAFETY AND HEALTH COMMITTEE
Marjorie Corcoran, Chair
John Boright
Maxine Savitz
David Shirley
Gregory Snow

NOMINATING COMMITTEE
Paul Grannis, Chair
Melvyn Shochet
Gregory Snow

PHYSICS COMMITTEE
Donald Hartill, Chair
Jonathan Bagger
France Cordova
Jerome Friedman
Paul Grannis
Frank Sciulli
Benjamin Shen
Melvyn Shochet
Thomas Weiler

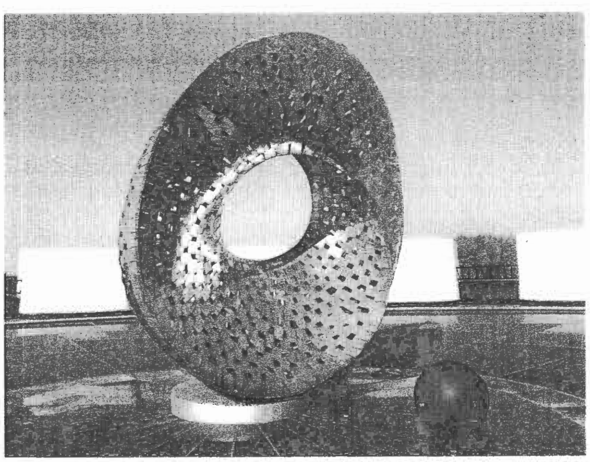
EXTERNAL COMMITTEES

URA VISITING COMMITTEE FOR FERMILAB

	Term Expires
James Siegrist, Chair Lawrence Berkeley National Laboratory	2002
Sally Dawson Brookhaven National Laboratory	2004
Lawrence Gibbons Cornell University	2004
Michael Harrison Brookhaven National Laboratory	2002
Stuart Henderson Spallation Neutron Source	2002
Yorikiyo Nagashima Osaka University	2004
Meenakshi Narain Boston University	2004
Rene Ong University of California, Los Angeles	2004

FROM THE FERMILAB BOARD OF OVERSEERS

Jonathan Bagger Johns Hopkins University	2003
Donald Hartill Cornell University	2002



Robert Wilson did the welding himself for Mobius Strip, *mounted atop Fermilab's Ramsey Auditorium. Wilson welded 3"x5" pieces of stainless steel to a tubular form eight feet in diameter.*

FERMILAB PHYSICS ADVISORY COMMITTEE

	Term Expires
Peter Meyers, Chair Princeton University	2002
James Alexander Cornell University	2005
James Brau Oregon	2006
Robert Cousins University of California, Los Angeles	2003
Adam Falk Johns Hopkins University	2002
Takahiko Kondo KEK	2006
Andrew Lankford University of California, Irvine	2005
Joseph Lykken Fermilab	2004
Hitoshi Murayama University of California, Berkeley	2006
Michael Peskin SLAC	2003
Ronald Poling University of Minnesota	2003
Natalie Roe Lawrence Berkeley Laboratory	2004
Heidi Schellman Northwestern University	2005
Paul Tipton University of Rochester	2005
Tejinder Virdee CERN	2004
Taiji Yamanouchi Secretary (Fermilab)	

PHOTO CREDITS:
Fred Ullrich, Reidar Hahn and Jenny Mullins
Fermilab Visual Media Services

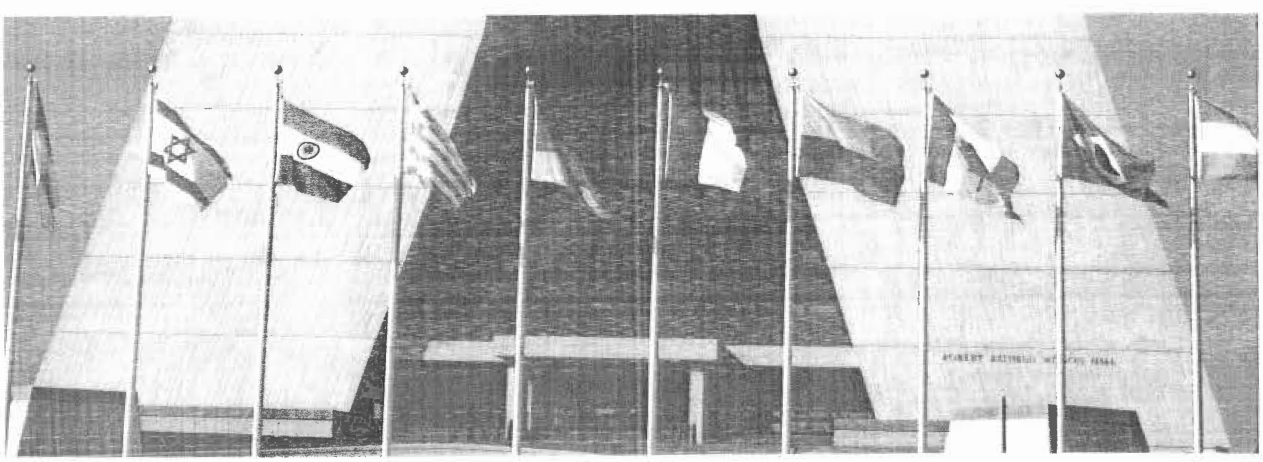
FINANCES

Universities Research Association, Inc.

OPERATING STATEMENT

Year Ended September 30, 2001

Total Revenue	$ 319,956,053
EXPENSES:	
Salaries, wages and benefits	$ 152,587,800
Subcontracts and purchased services	37,778,628
Materials and supplies	23,532,773
Travel, relocation and other employee allowances	7,380,418
Electric power	14,384,952
Inventory usage	4,044,643
Fermi National Accelerator Laboratory support	693,978
Scholarships	133,500
Other	513,806
Total Operating Expenses	$ 241,050,498
Cost of property, plant and equipment constructed for DOE	$ 78,539,162
Total Expenses	$ 319,589,660



Flags of nations representing Fermilab's international user community fly in front of Wilson Hall. High-energy physics has long been a leader in international scientific collaboration. Future progress will require even greater international cooperation to build accelerators and detectors to reach new energy frontiers.

Universities Research Association, Inc.

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