

# F E R M I N E W S

F E R M I L A B

A U.S. DEPARTMENT OF ENERGY LABORATORY



"We Wish You Strength and Courage" 2

Photo by Fred Ullrich

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# “We wish you strength and courage”

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*“I hope that the spirit of collaboration, which is usual in our community, will finally win over hatred and become a standard for the whole world.”*

—Michael Danilov

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by Judy Jackson

The tragic events of September 11 have left no part of American life untouched. At the same time, they have underscored our connection to the world beyond our frontiers.

High-energy physics is a deeply international science. For decades, the size and scale of the tools of their trade have drawn particle physicists together in multinational collaborations at the few places in the world where they can find the accelerators and detectors that their research requires. The advent of transatlantic jet travel in the 1960s may have had as much to do with shaping the nature of modern high-energy physics research as the development of accelerator and detector technology. It has made every high-energy physics laboratory a world laboratory.

More profoundly, beyond accelerators and jumbo jets, a common dedication to the understanding of nature’s laws that transcends national and cultural differences brings physicists together. In an October 1967 speech, the eminent physicist Victor Weisskopf, former director general of CERN, spoke of this unifying purpose.

“The significance of scientific collaboration,” Weisskopf said, “far exceeds the narrow aim of a more efficient prosecution of our scientific endeavors. It stresses a common bond between all human beings. Scientists, wherever they come from, adhere to a common way of thinking; they have a common system of values that guides their activities.”

In the days following the September 11 terrorist attacks in the United States, the worldwide family of particle physics came together in solidarity and support for their American colleagues. Fermilab received an outpouring of messages from around the world. At noon on the Friday following the tragedy, three minutes of silence marked the remembrance of the victims and their families, not only at Fermilab but also at CERN.

The concluding words of Weisskopf’s 1967 speech might have been spoken for us and for our time.

“We must keep the doors of our laboratories wide open,” he said, “and foster the spirit of supranationality and human contact, of which the world is so much in need. It is our duty to stick together, in spite of mounting tension and threatening war in the world of today. The present deterioration in the political world is a reason stronger than ever for closer scientific collaboration. The relations between scientists must remain beyond the tensions and the conflicts of the day, even if these conflicts are as serious and frustrating as they are today. The world community of scientists must remain undivided, whatever actions are taken, or whatever views are expressed in the societies in which they live. We need this unity as an example for collaboration and understanding, as an intellectual bridge between the divided parts of mankind, and as a spearhead toward a better world.” ☒

## MESSAGE FROM THE FERMILAB DIRECTOR:

Dear Fermilab Colleagues,

Today, Friday, September 14, at 12:00 noon, I ask you to observe three minutes of silence, in remembrance of the victims of Tuesday's attack, in sympathy for their families, and in solidarity with our nation and our nation's friends around the world.

Michael Witherell



## FROM THE CERN DIRECTOR GENERAL:

GENEVA—Following the terrorist attacks recently committed in the United States of America, and according to the recommendations of the Council of the European Union, I ask you to observe three minutes of silence Friday, 14 September 2001 at 12h00, as a sign of deepest sympathy for all the victims and their families, and of solidarity with the American people.

Luciano Maiani

## FROM THE DESY DIRECTOR:

HAMBURG—With deepest shock we have seen the totally senseless attack on humans and institutions in the US. Helpless, as anyone is in this situation, we would like at least to share with all of you our deep sympathy. For many years, scientific collaborations have played an important role in fostering the understanding of humans across borders. I hope this spirit will finally win over fanaticism. Please let us know how we can help. In the name of all persons working at DESY,

Albrecht Wagner



## FROM THE KEK DIRECTOR GENERAL:

TSUKUBA, Japan—Those of us at KEK still do not know the words for how to convey our thoughts and feelings to you after this unbelievable terrorist attack in the USA. The world changed on that day. We are with you in sharing both deep sorrow and in trying to recover from the formidable shock of these events. On behalf of all the KEK staff, I send our sincere sympathy and condolences to the victims, their families and friends. At the same time we hope that no one in your laboratory was involved in the horrible destruction. Our physicists staying in the US under the Japan-US high-energy physics cooperation were found safe. I believe they are not discouraged by the attack but remain devoted to their collaborations.

Hiroataka Sugawara



PROTVINO, Russia—On behalf of IHEP personnel we express our deepest condolences to all American people in connection with the horrible tragedies in New York and Washington DC. This terrorist attack is against all the civilized world. Please accept our feelings of sympathy and support.

A. Logunov, *Director*  
N. Tyurin, *First Deputy-Director*  
*State Research Center of Russia,*  
*Institute for High-Energy Physics*



FRASCATI, Italy—We have no words to express the deep concern and grief we feel for the American people and everyone who has been touched by the terrible events of these days. Our thoughts are with all those who have to find the strength to bear their great loss. From myself and all the staff and collaborators of LNF.

Paolo Laurelli  
*Director, Frascati National Laboratories*



GENEVA— I 'd like to express to you all my solidarity and that of your sister lab, CERN, for the barbarous attack to America and, in fact, to the civilized world. Nothing can justify what we have seen and what has been inflicted to you. I hope sincerely that none of your people has been involved. *Non prevalebunt!* (They shall not prevail!)

Luciano Maiani  
*Director General, CERN*



ROME—We are all shocked by the horrible attack on the U.S. I wish to express the sympathy of the whole INFN Community.

Enzo Iarocci  
*Istituto Nazionale de Fisica Nucleare*



**PARIS**—I was breathless and shocked when I discovered the inhuman news. I was greatly saddened to learn the horrible events that strike America. I assure my great solidarity and my deep compassion to all my American friends. With all these regards, be confident of our faithful and loyal heart. We are on your side.

Bernard Charpentier  
*(former scientific attaché to the French Consulate in Chicago)*



**MOSCOW**—We express our deepest condolences on the occasion of these awful terroristic acts.

We wish you strength and courage.

Peter Bogdanov  
*Ministry of Atomic Energy*



**KILTEGAN**, County Wicklow, Ireland—We want you to know that our small country is with you in prayer and in spirit. We have a full day of National Mourning in Ireland (September 14). The entire country will be closed and everyone is planning to go to church at 11.00 a.m. local time. As our president, Mary McAleese, has said: "It's not just a crime against the American people, it's not just a crime against the American civilisation. It's a crime against the very foundations of all our humanity." Keep your spirits high, keep the flag flying. The US may have been hit but it has not been knocked out.

Fr. Michael McCabe



**GRAN SASSO**, Italy—In Italy we are completely shocked. We have just finished an international conference and almost everybody decided to try to be back home as soon as possible. Yesterday we stopped the conference as soon as we knew about the terrorist attacks. We spent hours together watching the news on TV and thinking about our friends and families in USA. I don't know really what to say, it seems a nightmare. All the best for all of you. Ciao!

Roberta Antolini  
*INFN Public Affairs*



**PROTVINO**, Russia—Please accept my deep condolences in connection with the horrifying tragedies which happened today in New York and Washington. This attack of terrorism is against everyone, and here in Russia we would like to divide among us the pain of the American people.

Nikolai Tyurin  
*Institute for High-Energy Physics*



**SAIGON**—We are deeply sad learning about the attack on the World Trade Center and wish to express to you as to all our friends in the States our friendship and sympathy at this tragedy. We pray for all the victims of this attack.

Jean Trần Thanh Vân



**CHICAGO**—On behalf of the Government and people of the Republic of China, this Office wishes to express profound sympathy and condolences to the American people, the victims and all those who have suffered in the wake of this national tragedy, and condemnation of the violent attacks.

Taipei Economic and Cultural Office  
*Chicago*



**GATCHINA**, Russia—It's hard to believe in what has happened. This tragedy is a shock for all us. Today our hearts are with the American people. We feel and share the pain with you.

Olga Khrapovitskaya  
*Foreign Affairs Department  
Petersburg Nuclear Physics Institute, Russia*



**SAIGON**—I am very deeply shocked by what happened September 11 in New York. It is out of our imagination that man has capacity to do such wicked acts. I want to share your sorrow. I am standing with you and USA in the frontier against terrorists. From Saigon I would like to send you my deep gratitude for many things you did for us.

Nguyen Mong Giao

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# *I am standing with you and USA in the frontier against terrorists.*

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Nguyen Mong Giao



**MOSCOW**—ITEP people have been shocked by the terrible terrorist attack on your country. I can understand your feelings since there were terrorist bombings my own city. I hope that none of our colleagues has suffered in this dreadful event. I also hope that the spirit of collaboration, which is usual in our community, will finally win over hatred and become a standard for the whole world. In the name of all persons working at ITEP,

Michael Danilov  
*Scientific Director, Institute for Theoretical and  
Experimental Physics*



**TORINO**, Italy—Everybody here is deeply shocked by the news of the tragic events in your country. We feel ourselves so close to you and to all our American friends in Fermilab, E835 and BTeV, in these days of grief. Please accept my personal condolences, as well as those of my colleagues in Torino. With deepest sympathy.

Ezio Menichetti  
*INFN-Torino*



**NOVOSIBIRSK**, Russia—Here are our deep sorrows on the occasion of the tremendous tragedy befalling the U.S. nation, a tragedy of the whole modern world. Please accept our most sincere condolences on this frightening tragedy. But life is continuing and we have to do as much as we can for the success of our collaboration, as our best contribution for improvement of this imperfect world.

S. Skrinsky  
*Director, and Members of the Scientific Council,  
Budker Institute of Nuclear Physics*



# SERVICE a Way of Life for Fermilab Firefighters

## Fermilab's Firefighters

Jack Steinhoff, Chief  
John Babinec, Lt.  
Billy Clayton  
Neil Dal Cerro, Capt.  
Richard Graff  
Greg Hansen  
Joel Hurst  
Dan Jackson  
Don Kerbs  
Chuck Kuhn, Lt.  
Ryan Lambert  
Larry Meyer, Capt.  
Bryan Needham  
Rod Oxe, Lt.  
Derek Piec  
Alex Silva  
John Slowiak, Capt.  
Chris Williams  
Russ Wood

by Mike Perricone

Going around the table, they take turns reciting their lengths of service: Firefighter Greg Hansen, 22 years, Don Kerbs, 22 years, Joel Hurst, 25 years, Captain Larry Meyer, 33 years, Chief Jack Steinhoff, 30 years. Meanwhile, firefighter Alex Silva is growing a sheepish grin.

"I'm almost embarrassed to say it—only six years," Silva finally offers, leaving himself open for immediate kidding about "bringing down the average."



Jack Steinhoff

Summing up the years tells that firefighting is more than a profession; it is a life, an around-the-clock occupation. Fermilab's crews work 24 hours on duty, followed by 48 hours off duty. The shifts usually add up to 56 hours per week, and always include one part of the weekend (Friday, Saturday or Sunday) with the inevitable interruptions of family plans and events at home. The life doesn't stop at the boundaries of the job; 14 of Fermilab's 18 firefighters are also volunteer firefighters in their communities.

The job runs in families; Hurst's father was a volunteer firefighter in Elmhurst; Steinhoff's father was a fire chief in Stickney and a fire captain at Western Electric. Firefighting also creates its own family. Silva says that living alone, he anticipates the time at work as a family experience. He likens sitting down for a meal with the firefighters on his shift to sitting around a table with his brothers. Silva isn't using the term lightly; all of them openly call each other brothers (and sisters, although Fermilab currently has no female firefighters).

"It's the camaraderie that grows from spending a third of your life together, and facing potentially dangerous conditions together," says Kerbs.

The bond extends to other firefighters in other fire companies—in fact, to any firefighter in any firehouse in any city. Traveling, vacationing, looking for directions, seeking a spot for a good meal, a firefighter will drop in at a local firehouse, from New York to Honolulu and anywhere between.

"As soon as they know you're a firefighter," Steinhoff says, "the first thing they'll say is, 'Come in and eat something with us.'"

That simple but symbolic connection tells why the grief is so personal in the faces of firefighters at memorial services in New York City. That bond tells why Fermilab's firefighters feel they lost 350 brothers and sisters at the World Trade Center, and why the black bands on their badges carry palpable but immeasurable weight. Meyer notes that the terrorist attack on the morning



Photos by Reidar Hahn

Kids love fire engines and firefighters, and firefighters love kids. Russ Wood (left) and Alex Silva gather with kids from the Fermilab day-care center during Fire Prevention Week last year.

of September 11, 2001 coincided with the shift change for the New York firefighters, and no one went off duty. The departing shifts stayed on with the incoming shifts and responded to the disaster.

“Whole companies were wiped out,” Meyer says. “Losing this many—it’s never happened before.”

The loss of top officers was also unprecedented, including three of New York’s most senior fire officials—first deputy commissioner William Feehan, chief of department Peter Ganci, chief of special operations Raymond Downey. These weren’t leaders who took up positions safely in the rear.

“They were doing exactly what the situation dictated, setting up a good central command post,” Kerbs explains.

Without exaggerating or dramatizing the comparison, the Fermilab crew knows the common factor linking the 110-story twin towers in New York City to the lab’s own signature building, 16-story Wilson Hall. In firefighting terms, both buildings qualify as “high-rises,” the description applied to any building over 75 feet tall. In firefighters’ minds, responding in either situation could mean knowingly jeopardizing their own lives.

“One of the stories from New York involved a firefighter helping an older woman out of the building,” Hansen recalls. “When he turned around to go back to the scene, she called after him, ‘Where are you going?’ He said, ‘I have to go back in there.’ That’s what we do, and it’s something we understand when we take the job.”

“You try not to dwell on it,” Meyer continues. “But when you take the job, it’s always there. You try to use your training and experience to avoid that kind of situation. But at some time, it may simply be inevitable.”

Meyer compares firefighting to a military operation, with the hierarchy of officers, the organization of companies, brigades and battalions. He cites the ceremony granting promotions to more than 150 New York firefighters in the aftermath of the World Trade Center disaster.

“It was very much like giving field promotions during battle,” he says. “The job is very much like being a soldier. You accept that, and you move on.”

Like soldiers, firefighters rely on intense training and a daily attention to detail. The Fermilab site holds out special challenges: cryogenic systems, oxygen-deficient areas, tightly confined spaces,



Larry Meyer



# Fermilab Firefighters

unusual materials such as beryllium and lithium, and the possible presence of radiation. At any time, at least one department member is probably attending a class, conference or seminar, with programs ranging from regular State of Illinois certification requirements to arson investigation schooling. There are daily department exercises—practices, plainly put. Smoke alarms and fire extinguishers are checked monthly all over the site. Department members offer training to lab employees for using fire extinguishers and respirators. Shining up a vehicle is only the most visible example of painstaking daily maintenance, testing and organizing of equipment that must work on a moment's notice—perfectly—in answering more than 400 calls a year.

Fermilab's fire department has seven vehicles: Ambulance 751, with basic life support equipment; Squad 701, with fire rescue equipment and extrication tools; Engine 702 and Engine 703, with pumps, hose and water tanks; Grass Unit 705, a 4x4 with small pump, tank and hose specifically designed for grass fires; Command Vehicle 707, an SUV for the shift commander; and a sedan, Chief's Car 710. The department has no vehicles that would be classified as "trucks," which carry aerial ladders from 65 to 100 feet long. Neighboring communities would respond with trucks if needed. Fermilab provides automatic aid in times of need to Batavia and Warrenville, and belongs to the Northern Illinois Mutual Aid Box Alarm System (MABAS).

Like all firefighters, Fermilab's department offers another automatic response: a delight in kids. Daughters and Sons to Work Day at Fermilab has become the setting for an annual fire department blockbuster display, last year featuring a demonstration on escaping from a burning building. For school groups, for visits on Fire Prevention Week, for virtually any kid who can imagine hanging onto a speeding truck with sirens blaring, firefighters have a smiling welcome.

"Kids play with toy trucks, and we've got the big ones," Hansen says. "Kids love the uniforms, the helmets, the coats, the boots. And I think we respond because we identify with our own kids."

Throughout this break to talk about their work, all six have an ear cocked for the radio that crackles intermittently. None of the messages command their response, but their postures change, their eyes shift, and their readiness is unmistakable. How dangerous does their job get? No one really wants to give an answer, but the chief responds.

"The potential is always there," Steinhoff says. 🚒

## On the Web

### Fermilab Fire Department History:

[http://www-esh.fnal.gov:8001/FD\\_History/FD\\_History\\_2001.htm](http://www-esh.fnal.gov:8001/FD_History/FD_History_2001.htm)

### Fermilab Fire Department

[http://www-esh.fnal.gov/home/esh\\_home\\_page.page?this\\_page=5](http://www-esh.fnal.gov/home/esh_home_page.page?this_page=5)

### New York City Fire Museum

<http://www.nycfiremuseum.org/>

### "I wish you could see..."

<http://www.setel.com/~sarah/fireman.html>

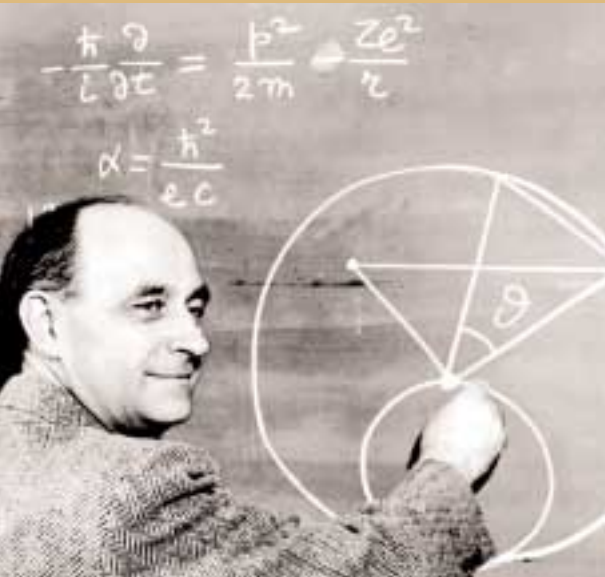


Photo by Reidar Hahn

Chris Williams (left) and John Babinec admire the giant sunflowers rising from their vegetable garden outside the Fermilab fire station at Site 38.



# THE LAST UNIVERSAL PHYSICIST



*This week,  
Fermilab celebrates the  
one-hundredth anniversary  
of the birth of  
Enrico Fermi,  
from whom our laboratory  
takes its name.*

*Physicist Chris Quigg  
offers this  
appreciation of  
Enrico Fermi, physicist.*

**On the Web:**

<http://www.fnal.gov/pub/about/whatis/enricofermi.html>

**Fermi stamp first-day cancellations:**  
see Page 15.

On the occasion of his one hundredth birthday, we honor a great scientist who was born in Italy, made immense and lasting contributions to the birth of modern physics, and emigrated to the United States, where he carried out experiments and theoretical studies that ushered in the atomic age.

Enrico Fermi was born in Rome on September 29, 1901, and received his doctorate from the University of Pisa in 1922. After fellowships in Göttingen and Leiden, he lectured for two years at the University of Florence. In 1927, Fermi was elected the first professor of theoretical physics at the University of Rome, where he attracted a brilliant group of students and collaborators.

The scientific work of Fermi and his circle influenced an astonishing range of topics, many of which are of high interest in the year 2001. An uncanny instinct for the most important questions and a remarkable gift for simple, direct explanations are hallmarks of Fermi's contributions. Scientists hold him in awe as "the last universal physicist."

In a lifetime of scientific achievement, Enrico Fermi's work on neutrons and radioactivity had perhaps the broadest impact. Following the observation of artificial radioactivity, Fermi found that nuclear transmutation occurs in nearly every element bombarded by neutrons. That work led him to discover the special effectiveness of slow neutrons for inducing nuclear transformations, which in turn led to the discovery of nuclear fission and the production of artificial elements.

Enrico Fermi was awarded the 1938 Nobel Prize in Physics for his neutron research. He and his family used the occasion of the Nobel ceremony to escape the tightening grip of fascism; he joined the tide of illustrious immigrants who transformed the American scientific community, taking a professorship at Columbia University.

In the discovery of fission, Fermi saw the possibility that the emission of secondary neutrons could sustain a chain reaction. With tremendous enthusiasm and his characteristic clarity of thought, he directed a series of classic experiments that eventually led to the atomic pile and the first controlled nuclear chain reaction, observed by his team on December 2, 1942 in Chicago.

Fermi became an American citizen in 1944. For the next two years, he served as Associate Director of the Los Alamos Scientific Laboratory in New Mexico, and was among the witnesses to the first nuclear explosion in the Alamogordo desert. At the end of the war, Fermi accepted a position at the Institute for Nuclear Studies at the University of Chicago, where he established another great school of physics. Until his death in 1954, his main scientific interest was in the new field of particle physics.

Fermi's contributions to science, teaching, and public service make him a continuing inspiration to other scientists and to young people today. His name lives on in the Enrico Fermi Institute at the University of Chicago, where the range of superb scientific research carries on his legacy; the Fermi National Accelerator Laboratory (Fermilab), in Batavia, Illinois, the particle physics laboratory that is home to the world's most powerful accelerator; and the Fermi Award, a Presidential award that is one of the oldest and most prestigious science and technology honors given by the United States government.

At Fermilab this week, we commemorate the life and work of this outstanding scientist and great American citizen. 📧

# Shipping Delivers

*When It Absolutely, Positively Has to Get There*



by Mike Perricone

**H**ow do you ship a particle accelerator—to California?

Carol Weissert-Jagger and the Fermilab shipping department met that challenge in 1990, loading a dismantled 250 MeV proton synchrotron onto a moving van. When the accelerator reached its destination, Loma Linda University Medical Center used it to establish the world's first hospital-based proton therapy cancer treatment center.

Another major moving plan around that time was never put into effect: shipping Fermilab's DZero detector to the Superconducting Super Collider. But Weissert-Jagger and the shipping department actually figured out the details of getting the 5,000-ton, apartment-building-sized apparatus dismantled and delivered by a complicated sequence of barge, rail and truck transport to Waxahachie, Texas.

From data cartridges to plastic scintillator, from computer chips to magnets to collider detectors, if there's a way to get it there, the shipping department will make it happen. Within reason, of course.

"We try to never say 'never,'" said Weissert-Jagger, more familiar as "Peaches" throughout her 33 years at Fermilab. "But not everything can get everywhere overnight, no matter what the commercials say. You have to realize that Novosibirsk is 4,000 miles east of Moscow, and that Malarguë, Argentina is a long way from anywhere."

The terrorist attacks of September 11 removed everything from the realm of business as usual, including shipping and receiving.

"Fortunately, we were in a lull as far as our international outbound shipments were concerned," Weissert-Jagger said. "Air carriers like FedEx and DHL were affected, since no planes were in the air. However, ground carriers like UPS and other motor freight operators were not."

A shipment of components for the Compact Muon Solenoid detector, part of CERN's Large Hadron Collider project, had already been sent by ocean freight to Hamburg, Germany on the way to Russia for additional fabrication. That shipment arrived safely in Hamburg. But another shipment bound for CERN was delayed in the backlog of international freight arising from the ban on air traffic.

"Also, U.S. Customs is paying stricter attention to all shipments both in and out of the country," Weissert-Jagger added.



Carol Weissert-Jagger

Photo by Reidar Hahn

Photos by Stephen Shuman

They're prime movers in Fermilab's shipping department (from top): David Meyers; Jon Rushford and Brian Slatton; Claudie King; Harold Scheppman.

With assistants Al Elste and Claudie King, she is the supervisor of the shipping and traffic departments, which confront logistical hurdles every day. The hurdles can be geographic or bureaucratic. Shipments to Russia, for example, encounter frequently changing rules with a government where duties are a needed major source of revenue, “and even the Russian officials can’t keep up with the changes.” There are domestic challenges, too. The Main Injector Neutrino Oscillation Search (MINOS) experiment must ship its massive detector plates and other components to the mineshaft in Soudan, Minnesota, which is a half-mile underground—in a former iron mine that is one of the state’s major tourist attractions.

Another famous hurdle: large (17.5-foot) detector tanks that were built in New Hampshire and bound for Fermilab. The Department of Energy contacted all the states along the shipping route to obtain permission for the oversize loads. But the shipment, originally scheduled for winter, was delayed until the following summer—tourist and construction season. One state wouldn’t allow access at all; another wouldn’t provide a state police escort.

“We wound up routing it through Canada,” she recalled. “On one bridge, we had a total of about a half-foot of clearance.”

Weissert-Jagger points out that all it takes to get the shipping process started is a material move form, which is available on the Business Services website (<http://www-bss.fnal.gov/mmr>). Shipping can pick up an item and crate it, or accept an existing package to be shipped from the lab. The traffic department manages the progress of both inbound and outbound shipping, getting the best freight rates and auditing all freight bills.

Photo by Stephen Shuman



Both areas work closely with Fermilab’s Environment, Safety and Health section in shipping any hazardous materials or wastes.

“Every project that comes through shipping is very important, and it has to get there, and it’s under time constraints,” said Ron Haynes, manager of support services in Fermilab’s Business Services Section. “But all the steps take time: the items have to be picked up, crated, shipped out. We’ve seen that Carol and everyone else in shipping are both efficient and creative, and they’ve come up with some ingenious solutions over the years.” 🛠️



Photo by Reidar Hahn

Above: Ron Haynes (left) and Dan Nelson inspect a new Fermilab Taxi with lifting apparatus for wheelchair access. Left: Dennis McAuliff and Tom Smith load a forklift to prepare a shipment at Site 38.

# NuMI PROJECT

## Ready to Move On



by Kurt Riesselmann

Fermilab's Neutrino at the Main Injector project is still far from reaching the finish line; but in its race to become one of the top neutrino research facilities in the world, the project has overcome a big hurdle.

On September 13, a Department of Energy committee chaired by Daniel Lehman concluded its three-day review of the NuMI project and recommended the adoption of a new project budget of 171.4 million dollars and a schedule that would allow for the completion of the NuMI project by 2005.

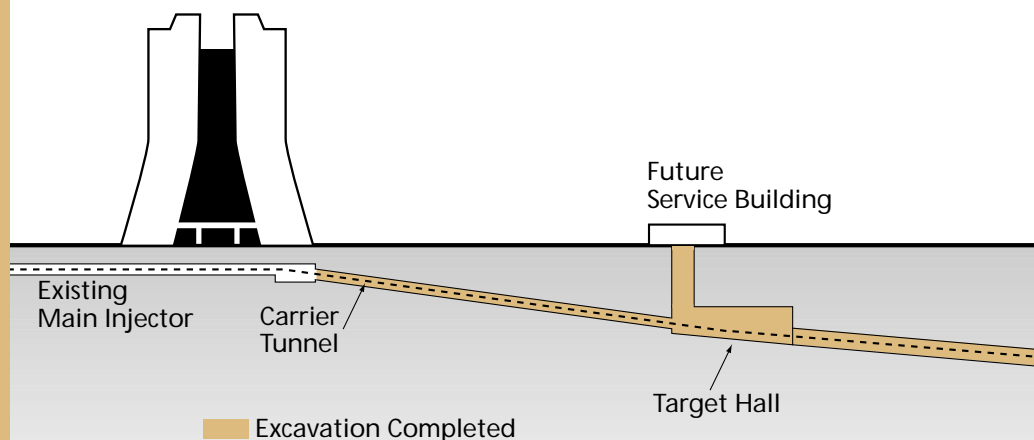
Three months ago the prospects of the NuMI project appeared far less promising. Faced with increased project costs and delayed schedules, Fermilab managers and collaborators had asked Lehman and his team of experts to "re-baseline" the project to account for a total project cost increase of 30 million dollars.

At that time, however, Lehman was "not ready to accept the changes yet." The project plans showed too many uncertainties, and the committee requested further engineering studies and changes in management and safety procedures to ensure that a single revision of budget and schedule would meet all demands through the end of the project.

"We took the outcome of that review [in May] very seriously," Fermilab director Mike Witherell told the Lehman committee at the recent review. "The committee said that there was more work to do before the project was ready for a new baseline, and they were correct. Since then we've held weekly meetings with the project management. We strengthened the project team and clarified responsibilities. We added a full-time safety expert and a full-time employee to supervise compliance with ES&H requirements," the Environment, Safety and Health regulations.

Witherell left it to NuMI project manager Dixon Bogert to answer the Review Committee's most pressing question. Did the project costs proposed in May further escalate?

Bogert announced the good news right at the beginning of his presentation: "We will complete the NuMI project within our new proposed estimates. We will finish the work within the proposed schedule."



The tunnel boring machine has progressed at a rate of about 32 feet a day. It has mined more than 50 percent of the total TBM drive, which started at the bottom of the Target Hall.

On the Web:

### Neutrinos at Fermilab

<http://www.fnal.gov/pub/inquiring/physics/neutrino/>

### The New NuMI-MINOS Pages

<http://www-nuMI.fnal.gov:8875/>

### The First MINOS Detector plane

<http://www.hep.umn.edu/minos/>

### Neutrino Experiments Worldwide

<http://cupp.oulu.fi/neutrino/>

“NuMI/MINOS is a unique experiment. This is the first step for re-baselining. I certainly believe this is a **very good start.**”

DOE associate director Peter Rosen, Office of High Energy and Nuclear Physics

Physicist Aesook Byon-Wagner and Bruce Baller, the new co-managers for the NuMI technical components, led the large effort of completing a “bottom-up” and “top-down” cost and contingency analysis of the systems required to build a beamline that extracts protons from the existing Main Injector accelerator and smashes them into a metal block, creating a high-intensity neutrino beam. For the bottom-up analysis, they asked engineers and lower-level managers to review the cost estimates of individual components needed for the various subsystems. In the top-down analysis, upper-level managers assigned cost uncertainties to subsystems containing tens to hundreds of components.

“Aesook and I met with every level-three manager one-on-one and reviewed cost estimates,” said Baller, who was appointed level-two manager in April. “Part of it was a learning experience for us, part of it was a ‘hole-catching’ exercise. We have reviewed 2,300 tasks and 122 tracking milestones for the technical components of the NuMI beamline.”

The careful review confirmed the cost increases that Baller had already reported at the May review. Now, however, the NuMI team based its cost estimates on more detailed studies and blueprints, reflecting the fact that a sufficient number of additional engineers, designers and physicists have joined the project team.

“We found good agreement between the bottom-up and top-down figures,” said Byon-Wagner, who joined Baller in May. “Compared to the May proposal, we found a 1.46 million dollar cost decrease for the technical components while the contingency allocation increased by 1.13 million. These refined cost estimates are conservative and well understood.”

It seems surprising that construction of the new underground laboratory started before scientists carefully planned every detail. But the approach resembles the construction of a house for which furniture still needs to be selected, bought and arranged. Advance planning of every single detail of a new scientific facility would delay the start of its construction by many years, hurting its chances in the race for discovery. For the NuMI beamline, unfortunately, some projections proved to be inadequate.

“The usual assumptions for a new beamline at Fermilab, including the reuse of equipment from existing beamlines, were not applicable,” said Byon-Wagner. “The NuMI beam will have high intensity delivered deep underground.”

The number of protons per year delivered by the Main Injector to the NuMI target will be more than 20 times higher than in previous fixed-target experiments, when protons came from the Tevatron. This jump in performance accounts for a large fraction of the increase in NuMI’s price tag.

Problems in the excavation of 4,000 feet of tunnels and two large underground halls for the NuMI project are also reason to re-baseline the project. In 1999, the bids for the tunneling contract came in much higher than expected. In addition, the excavation is about five months behind schedule.

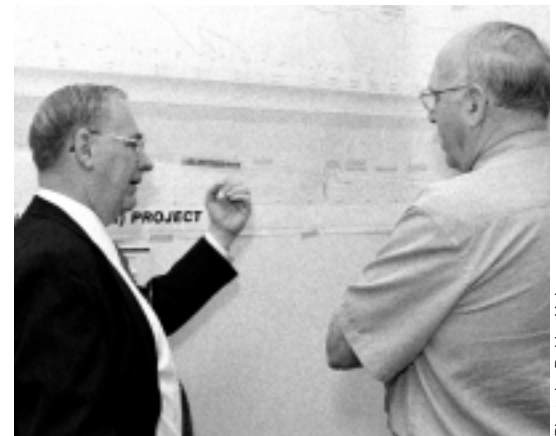
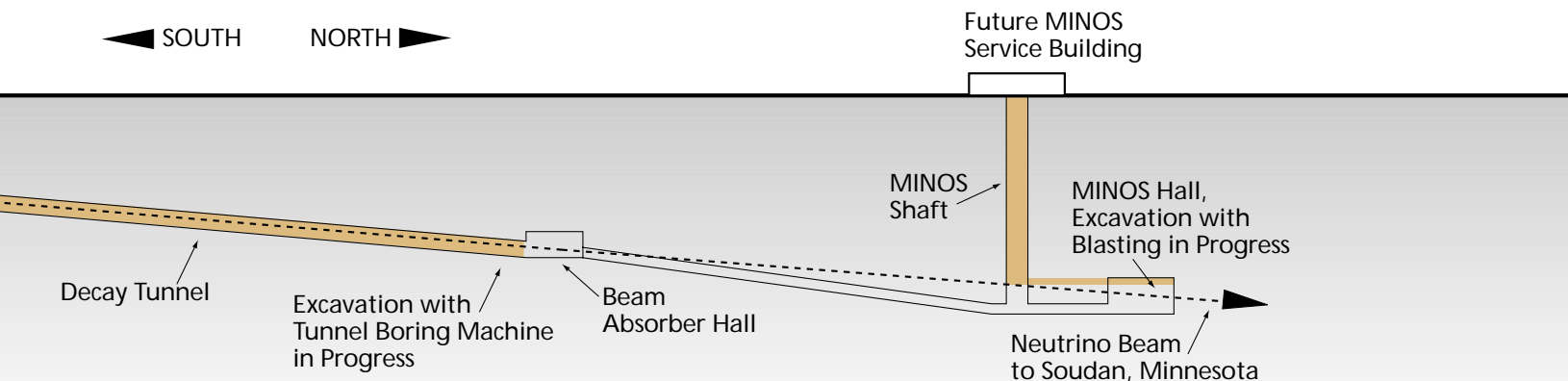


Photo by Reidar Hahn

Project manager Dixon Bogert (left) gives Review Committee member Bill Sproule, an independent consultant, an update of the NuMI underground construction.



# NuMI PROJECT

“Civil construction accounts for delays and additional costs of 16 million dollars, much of which is beyond our control,” Greg Bock, NuMI deputy manager, told the Review Committee. “The revisions in the beamline technical components add 14 million dollars plus schedule [delays].”

The new schedule forecasts a completion of the NuMI project in December 2004, when the first neutrino beam will travel 450 miles from Fermilab to a neutrino detector in a former iron mine in Soudan, Minnesota, about 2,700 feet underground. The neutrinos easily travel through rock and other material, and no tunnels extend beyond the Fermilab site.

Placing two detectors in the neutrinos’ path, one in a new underground hall at Fermilab and one in the Soudan mine, a group of 200 scientists from five countries, called the Main Injector Neutrino Oscillation Search (MINOS) collaboration, will look for changes in the neutrinos’ properties as they travel the 450-mile distance at almost the speed of light. Experiments in Japan and Canada have shown that neutrinos coming from the sun seem to undergo transformation. Studying this effect using neutrinos created by accelerators will allow for more precise studies in a laboratory-controlled setup.

The work on the detectors, which is part of the total budget, is progressing on schedule and without cost increase. On July 27, the MINOS collaboration



Aesook Byon-Wagner, member of the NuMI management team, explained the progress scientists had made in planning the new neutrino beamline.

For two days, Mark Ross (SLAC, left), Roy Cutler (ORNL), Lowell Klaisner (SLAC) and Derek Lowenstein (BNL), all members of the Lehman Committee, listened to numerous talks by project managers, reviewed hundreds of pages of documents and asked lots of questions. On the third day, the committee reviewed their findings and announced their conclusion: approval of the proposed NuMI budget and schedule changes.



Photos by Reidar Hahn

Daniel Lehman, chair of the Review Committee (front left), and DOE project manager Ron Lutha critically observed the NuMI-MINOS presentations. At the end, they both praised the progress the project had made.

installed the first of 486 detector planes in the Soudan mine, and work will be completed by September 2003.

At the review, Bock pointed out the critical tasks that defined the new schedule: the completion of the civil construction at Fermilab and the subsequent installation of the NuMI technical components. He called the new time frame “conservative,” and members of the Lehman committee agreed that “the proposed project schedule contains sufficient float,” allowing for completion as late as September 2005. They recommended that the proposed budget and schedule be used for re-baselining.

Department of Energy associate director Peter Rosen, who oversees the Office of High Energy and Nuclear Physics, attended the review as an observer. He was pleased with the positive outcome of the review.

“I want to congratulate the lab,” he said at the final session. “You’ve done an excellent job. NuMI/MINOS is a unique experiment. This is

the first step for re-baselining. I certainly believe this is a very good start.”

Closing the review session, chairman Lehman summarized the good work of the project team and the committee members in his typically efficient way.

“That’s it,” he said. “Job well done!” 🌟



## CALENDAR

Fermilab Arts Series  
Newport Folk Festival Presents:  
SUZANNE VEGA WITH BOB HILLMAN

Saturday, October 20, 8 p.m.  
\$29 (no student discounts)

**(Note: As of press time, Fermilab was not accepting outside visitors due to security restrictions. For the latest Arts Series scheduling information, please check the Web at [http://www.fnal.gov/culture/arts\\_series.shtml](http://www.fnal.gov/culture/arts_series.shtml).)**

Website for Fermilab events: <http://www.fnal.gov/faw/events.html>

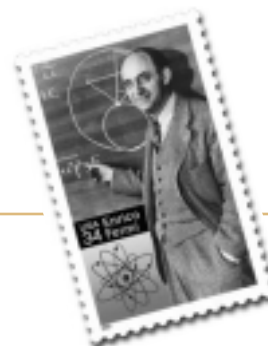
ONGOING  
NALWO

Free English classes in the Users' Center for FNAL users and their spouses. The schedule is: Monday and Friday, 9:30 a.m. - 11:00 a.m. Separate classes for both beginners and advanced students.

DANCING

International folk dancing, Scottish country dancing: for information on either group, and for the latest information on public access, call Mady 630-584-0825 or Doug x8194, or email [folkdance@fnal.gov](mailto:folkdance@fnal.gov).

Barn Dances: for information on scheduling and for the latest information on public access, contact Dave Harding (x2971, [harding@fnal.gov](mailto:harding@fnal.gov)) or Lynn Garren (x2061, [garren@fnal.gov](mailto:garren@fnal.gov)), or check the Web page (<http://www.fnal.gov/orgs/folkclub/>).



## FERMI STAMP First-Day Cancellations

To obtain first-day cancellations of the Enrico Fermi stamp, buy the stamps at a post office, affix them to self-addressed envelopes, place them in

a larger envelope, and mail by Oct. 29 to Enrico Fermi Commemorative Stamp, Postmaster, 433 Harrison St., 9th Floor, Chicago, IL 60607-9991.

## LABNOTE Fermilab Postpones September 29 Prairie Harvest, Children's Fermi Birthday Party

Due to heightened security measures at the Department of Energy's Fermilab, the autumn prairie harvest scheduled for Saturday, September 29 on the site has been postponed indefinitely.

A teachers' workshop and children's birthday party for Enrico Fermi, also scheduled for September 29, has similarly been postponed. No makeup dates have been set, and no decision has been made

on a second prairie harvest scheduled for November 2. For more information, call Fermilab's Office of Public Affairs (630-840-3351).

## MILESTONES

RETIRING

Mary Ellen Connolly (ID 09211, BS-Accounting), retiring December 31, 2001, last day will be October 17, 2001.

DIED

Ruth Christ, longtime Fermilab employee in the Human Resources Department, on Tuesday, September 18. A memorial service

will be held Saturday, September 29 at 10:30 a.m., at the Community United Methodist Church, 20 Center Road, Naperville.

LUNCH SERVED FROM  
11:30 A.M. TO 1 P.M.  
\$10/PERSON

DINNER SERVED AT 7 P.M.  
\$23/PERSON

## Chez Léon MENU

FOR RESERVATIONS, CALL X4512  
CAKES FOR SPECIAL OCCASIONS  
DIETARY RESTRICTIONS  
CONTACT TITA, X3524

[HTTP://WWW.FNAL.GOV/FAW/EVENTS/MENUS.HTML](http://www.fnal.gov/faw/events/menus.html)

LUNCH  
WEDNESDAY, OCTOBER 3

*Booked*

DINNER  
THURSDAY, OCTOBER 4

*Fresh Corn Timbale  
with Red Pepper Vinaigrette  
Ginger Chili Sea Bass  
with Grilled Tomatoes  
Steamed Spaghetti Squash  
Beet, Walnut and Gorgonzola Salad  
Peach Spice Cake with Caramel Sauce*

LUNCH  
WEDNESDAY, OCTOBER 10

*Potato-Horseradish Crusted Catfish  
Fillets with Roasted Pepper Relish  
Green Rice  
Chocolate Pecan Pie  
with Ice Cream*

DINNER  
THURSDAY, OCTOBER 11

*Booked*

## F E R M I N E W S

F E R M I L A B  
A U.S. DEPARTMENT OF ENERGY LABORATORY

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The deadline for the Friday, October 12, 2001, issue is Tuesday, October 2, 2001. Please send classified ads and story ideas by mail to the Public Affairs Office, MS 206, Fermilab, P.O. Box 500, Batavia, IL 60510, or by e-mail to [ferminews@fnal.gov](mailto:ferminews@fnal.gov). Letters from readers are welcome. Please include your name and daytime phone number.

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## VISITING FERMILAB ON THE WEB

As this issue of *FERMINEWS* went to press, Fermilab was closed to visitors due to heightened security restrictions. But visitors can still make a virtual visit to the lab through the Fermilab Web Site <http://www.fnal.gov>. Take a Virtual Tour of the lab at <http://www.fnal.gov/pub/about/tour/index.html> and make a virtual visit to Wilson Hall's newly-opened exhibit, PULSE: Accelerator Science in Medicine <http://www.fnal.gov/pub/pulse/Welcome!>

## CLASSIFIEDS

### FOR SALE

■ '91 Ford E-350 Clubwagon XLT, V8, auto, pwr window, a/c (not working), 105K, runs well. Asking \$2000 (well below the book value) Hank at x4341 or niu@fnal.gov

■ '90 Toyota Camry LE, 4dr. 2.0L, AC, automatic, power steering/windows/etc., AM/FM/cass+CD, 98K miles. New timing belt, front tires, brakes. Full maint. history. Asking \$3,800/o.b.o vkuznet@fnal.gov, x2192 (office) or 428-9872 (home).

■ Mustek - Paragon 600Pro Scanner, compatible with Macintosh or PC/AT - 300x600 dpi resolution Orig. box, instructions and floppies with the drive. \$45/o.b.o. Alma at 630-879-3809

■ Backpacks: 2 nearly new (outgrown) Kelty Jr. Tioga backpacks with frames; suitable for ages 10 to 15 or small adult—\$50 each; and 2 gently used Moonstone sleeping bags, excellent condition, full size, suitable to 28F—\$50 each; contact Sue, x5059 or mendel@fnal.gov

■ Red tubular bunk bed. 1 year old. Full-size bottom bed, twin size top, \$200. Call Jim at x4841.

■ Southwest Airlines round-trip travel voucher (transferable). Valid through Nov 3, 2001. Call ext. 6288 to make an offer.

■ Aerotech rocket launcher, rockets, reloadable engines: \$75; Midwest Electric airplane w/radio & 4 battery packs: \$150.00; Goldberg Piper Cub & SIG Ultimate Bipe FunFly & misc covering: \$50. Email jklemenc@fnal.gov x3311 for more information.

■ 2 SHOEL full face helmets \$100.00; 1 Sherwood RV-6010R audio video stereo receiver with 2 Infinity Reference 3-way series spkrs. like new \$400. Call 630-840-6771.

■ Free: large hot tub. Works fine, motor new two years ago. You move it. West Chicago location. Call ex. 4780.

### FOR RENT

■ Contemporary 4-BR, 3-BA cedar home on 2.5-acre wooded lot. Ten minutes from Fermilab and a five-minute walk to the forest preserve. \$1,700/mo. Call ext. 4780

### SERVICES

■ Furniture refinishing and restoration. Pick-up and delivery service available. 815-695-5460.

■ Cleaning service, professional, insured, residential or commercial, reasonable rates. Teri's Cleaning Service, 630-820-0564.

### GOLF LEAGUE

■ The Phillips Park Golf League just finished a fun season at Wolf Run with a final outing at Phillips Park on September 20. Jim and Patrick Biggs took first place, Richard Vidal took low average with 34.8, and Steve Baginski had most points. The league looks forward to returning to Phillips Park next year.

### WANTED

■ Tree seeds: Bur Oak, Red Oak, White Oak, Shagbark Hickory, Bitternut Hickory for Fermilab's Roads and Grounds Department to plant. The seeds should be separated by species, dried and kept cool. Drop seeds off at Road and Grounds or call Bob Lootens x3303 for a pickup. The donated seeds from last year are growing beautifully.

■ Renters for Fermilab Cooperative Education Student employees. Prefer inexpensive, short-term arrangements (5 to 8 months in duration) that do not require a lease. Great opportunity to rent single room in private residence with shared amenities. To list or for more information, please contact Shelley Krivich, Fermilab Employment Dept., at krivich@fnal.gov or 630-840-5809. Serious inquiries only.

## WILSON FELLOWS

Fermilab supports particle physicists early in their careers by providing unique opportunities for self-directed research in experimental particle physics. The fellowships are awarded on a competitive basis to Ph.D. physicists of exceptional talent as evidenced by their contributions to the field in their postdoctoral work. Fellows will work at Fermilab in areas of experimental particle physics of their choice. Wilson Fellowships are tenure track positions with an initial term appointment of three years. Each candidate should submit a curriculum vitae and a detailed statement of research interests and proposed activities; and should arrange to have four letters of reference sent to the address below. Application materials and letters of reference should be received by October 31, 2001. Materials, letters and requests for information should be sent to: Patricia L. McBride, Chairman, Wilson Fellows Committee, Fermi National Accelerator Laboratory, MS234, P.O.Box 50, Batavia, IL 60510-0500, email:mcbride@fnal.gov. More information can be found at our web site.<http://www.fnal.gov/pub/forphysicists/fellowships/wilson.html>. Fermilab is an equal opportunity/Affirmative Action Employer.

<http://www.fnal.gov/pub/ferminews/>



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