FERMI NEWS

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MINOS Ground Breaking **2**

Photo by Tom Foley

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GROUNDBREAKING in the Land of

by Judy Jackson

The long, straight road, empty of traffic, stretches through forests of pine, spruce, birch and poplar. Ahead, the silver skin of yet another lake gleams through the trees. Lost Lake, Clear Lake, Lake Vermilion. The road widens slightly for the town of Tower (pop. 561), where Zup's supermarket (www.zups.com) advertises hot bologna ("A taste treat that's hard to beat") every Thursday. A local radio station promotes handsewn mukluks to keep the toes toasty in temperatures of 40 below—a reminder, on a warm summer afternoon, of the evanescence of the season. Northeastern Minnesota—the Iron Range, the self-proclaimed "End of the Road"—is a long way from the western suburbs of Chicago.

But not for a neutrino.

Neutrinos make the 450-mile trip from Fermilab's Main Injector in Illinois to the Soudan Mine, just up the road from Tower, Minnesota, in about two milliseconds. And last month their destination got a lot closer with the groundbreaking, on July 20, for a deep cavern that will house the 5,000-ton steel MINOS detector that will record their journey.

Actually, it was an undergroundbreaking. Half a mile beneath the earth's surface, where iron mining operations ceased in 1962, officials wielding gold-toned pickaxes took the first strokes to chip away, at least symbolically, at the mysteries surrounding the elusive neutrino.

University of Minnesota physicist Earl Peterson welcomed guests to the undergroundbreaking. After a topside lunch of local walleye, guests took a nerve-tingling three-minute elevator ride to the subterranean ceremony in the former mine.

DOE's John O'Fallon, director of the Office of High Energy Physics, and Christine Maziar, vice president for research and dean of the graduate school of the University of Minnesota. O'Fallon, a Minnesota native, challenged MINOS collaborators to find ways to explain neutrino research to those who, like his 90-year old mother, wonder "What is it good for?"

Cover Photo: Undergroundbreakers prepare to take the first swing for the new MINOS cavern. From left, Fermilab Director Mike Witherell, MINOS spokesman Stan Wojcicki, Paul Maurer of the Minnesota Department of Natural Resources, Christine Maziar and Ed Wink of the University of Minnesota.

"How appropriate it is," said U.S. Representative James Oberstar (D-MN), in a videotaped statement shown at the groundbreaking, "in this place where miners from many nations unlocked nature's hidden treasures and extracted the richest iron ore, that today scientists from many nations are now working this mine to wrest from the very same billion-year-old rock a new lode of riches as old as the origins of the universe itself, the baffling neutrino."

Until recently, scientists believed that, unlike other fundamental particles of matter, neutrinos possessed neither mass nor electric charge. However, recent results from experiments in Japan, in Soudan itself, and elsewhere seem to point to a small mass for these particles. Because they are so numerous—each square meter of the atmosphere contains about 300 million—even a tiny mass for the neutrino would have big consequences for our understanding of the nature and distribution of mass in the universe.

For the MINOS experiment, Fermilab will direct an intense beam of one type of neutrinos, called muon neutrinos, from the newly-completed Main Injector accelerator to the Soudan detector, 450 miles away. Locating the detector half a mile below ground allows scientists to screen out cosmic rays that would otherwise flood the particle detector with unwanted signals. Beginning in early 2003, the MINOS (for "Main Injector Neutrino Oscillation Search") collaboration will use the detector to determine whether some of the muon neutrinos in the beam have changed to another type, known as tau neutrinos.

NEUTRINO HUNTERS **BREAK GROUND** UNDERGROUND FOR MINOS DETECTOR HALL

Such a change, or oscillation, from one type to another, would constitute clear evidence for neutrino mass and would allow physicists to begin to calculate just how much mass the particles possess.

The MINOS experiment differs from earlier neutrino-mass experiments because it uses an accelerator-produced beam of neutrinos rather than naturally occurring neutrinos from reactions in the sun and from cosmic ray interactions in the atmosphere. Earlier experimenters detected fewer solar and cosmic-ray neutrinos than they expected, leading them to conclude that one type of neutrino had oscillated to another type and hence "disappeared" from detection. In contrast, the MINOS experiment is designed to detect not only the disappearance of muon neutrinos, but also their appearance as neutrinos of a different type, tau neutrinos. When the experiment begins operating, experimenters expect to observe upwards of 10,000 neutrino interactions each year.

Christine Maziar, vice president for research and dean of the graduate school at the University of Minnesota, told the audience that groundbreaking day for MINOS had been ten years in the making.

"We are very eager to stop moving piles of paper and start moving rock," she said, and added, "I hope that all of you will leave here today with the clear understanding that we Golden Gophers do it underground."

Oberstar called the MINOS groundbreaking a "landmark event in the history of physics," and noted that it would also have beneficial economic consequences for Northeastern Minnesota, creating new jobs and injecting some $14 million dollars into the local economy over the next few years.

That'll buy a lot of mukluks—and, perhaps, a new understanding of the fundamental nature of the universe

10,000 Neutrino Interactions

Speakers at the undergroundbreaking included officials of the University of Minnesota, the Department of Energy, the Minnesota Department of Natural Resources, the MINOS collaboration and Fermilab.

"Just as we build telescopes to explore unknown reaches of the universe," said Fermilab Director Mike Witherell, "we build accelerators to help us fill in this part of the universe, the neutrinos, that we don't understand."

Witherell invited guests at the groundbreaking to return in just over three years for "first light," or its neutrino equivalent, at the detector.

"I remind you that this is northern Minnesota and we'll be detecting the first neutrinos in the month of January," quipped University of Minnesota physicist Earl Peterson, manager of the university's Soudan Laboratory and master of ceremonies for the groundbreaking. "We'll find out who really cares about this experiment."

Photos by Tom Foley

The cavern of the Soudan Laboratory, located half a mile underground in a former iron mine, now a Minnesota state park. The drawing on the wall shows the location of the entrance to what will be a new cavern for the 5,000-ton MINOS neutrino detector. Behind DOE's John O'Fallon, at the podium, is the face of a Golden Gopher, mascot of the University of Minnesota.

A GOOD NEIGHBOR SAVES ENERGY

Photo by Fred Ullrich

The new state-of-the-art pumping station at the heart of Fermilab's cooling system was recently shut down in part to reduce power use.

by Sharon Butler

You heard about Plan A in the last issue of FERMINEWS. This is Plan 0, and it's already been implemented at least twice.

The first time was on Friday, July 23, after Commonwealth Edison made an apparently desperate appeal asking if Fermilab would reduce its power use by 20 megawatts. Temperatures were sizzling, and power demand in the Chicago area was more than the utility could handle.

Under an arrangement Fermilab renewed with ComEd this year, the utility can ask, but the Laboratory doesn't have to agree. If it does agree, however, Fermilab earns a credit on its monthly electricity bill. The credit equals the amount ComEd would have had to pay if it had bought the electricity at market rates from another supplier.

This time, Fermilab's directorate agreed.

And so, Plan 0 went into action.

Over in the Main Control Room, under the direction of Bob Mau, head of the Operations Department in the Beams Division, the major power supplies were shut off to the Booster, the Main Injector, the Tevatron—"essentially anything delivering beam to the experimenters," according to Mau.

By shutting off the accelerators, Mau said, power use was reduced by 15 megawatts in a mere 15 minutes. The trick was finding another five megawatts, which took almost another three hours.

Mau called his "power SWAT team" to help shed power.

Over in the Central Helium Building Liquefier, saving two megawatts of power, Jerry Makara turned off the nitrogen compressor, figuring that Fermilab could always buy liquid nitrogen from a supplier if need be. Fermilab also has a four-day backup supply.

In the CDF assembly hall, Keith Schuh turned off about half of the air-conditioning units. And Tom Kraus, in the Central Utility Building, lowered the setpoint on the air-conditioning for the high-rise offices by 10 percent.

Other "SWAT team" members contributed a few kilowatts here; a few kilowatts there. On a monitor in the Main Control Room, Mau watched as power levels dropped in all the major feeder cables ("I can see if people are cheating, too," he said with a grin). But the levels weren't dropping enough.

As a last resort, instructions were loaded into a computer to shut off the lights in Wilson Hall at 12:30.

At 12:20, in the nick of time, with just 10 minutes to go before the high-rise went dark, a few more power supplies in the Central Utility Building were turned off, and Wilson Hall was saved.

The following Monday, Fermilab once again shed 20 megawatts of power in response to a request from ComEd. This time the procedure was easier. In an hour, the Laboratory had reduced power by 20 megawatts. “Just do what you did on Friday,” Mau told the SWAT team.

When Fermilab agrees to give ComEd 20 megawatts of power, said Bruce Chrisman, associate director for administration, it first considers whether the shutdown would jeopardize accelerator operations. On Friday, the accelerators were already down for repairs.

“The main thing we desperately want to avoid is warming up the accelerators,” said Chrisman. While restarting the accelerator complex takes a day or two, according to Mau, cranking up the cryogenic system that cools the magnets can take a week. Also, magnets can be damaged if they are repeatedly heated up and cooled down.

Motivation to participate in ComEd’s program is in part money. Fermilab can save $20,000 or more per incident. The Laboratory’s monthly electricity bill is about $1.5 million. By pitching in, Fermilab might also help avoid rolling blackouts, although ComEd hasn’t yet resorted to such a strategy.

“We’re one of ComEd’s biggest customers in the state of Illinois,” Associate Director George Robertson told employees last year. “As a big energy user, we can help our neighbors by becoming a big energy saver.”

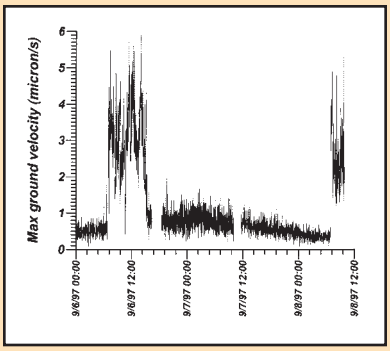
Photo by Reidar Hahn

Utility poles designed by Fermilab’s founding director, Bob Wilson, bring in electrical power from Commonwealth Edison.

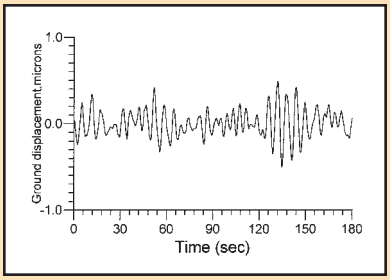
From the Main Control Room, staff can monitor power feeder cables throughout the site.

The Not-So-Good Earth

by Sharon Butler



Seismic probes on Fermilab property recorded vibrations of the earth due to construction activity at the Main Injector. Work started at 7:00 a.m. on Saturday, September 6, 1997, ceased at 11:00 for a short lunch break, and then continued until about 3:00 p.m. On Sunday, activity was limited, but it started up again on Monday morning. (The two blank periods in the data occurred when the probes were removed for analysis.)



On a quiet night at Fermilab, researchers were able to record the famous "seven-second hum," microseismic waves caused by the ocean beating on the shore.

The terra is not exactly firma, as any geologist knows.

Even on the most ordinary of days, the ground we walk on is, as Vladmimir Shiltsev likes to say, "a sea of micron- and submicron-sized storms, tides, whirls and waves."

Shiltsev, a Wilson Fellow at Fermilab, worried that this jiggling of the earth, while imperceptible to the ordinary passerby, might still be enough to perturb the large colliders the Laboratory contemplates building here one day.

For Fermilab's Tevatron, ground motion poses no problem. But these future colliders—whether a muon collider, a very large hadron collider or a linear collider—will be very sensitive both because they will be larger than the Tevatron (as large as 500 kilometers in circumference for one design of a very large hadron collider) and because the diameters of their beams will be narrower. Colliding two beams in these machines will thus be tricky.

"Imagine two hunters standing dozens or even hundreds of miles apart and shooting tiny bullets only a few dozen microns in diameter to meet halfway and exactly head-on," Shiltsev said. "And the hunters themselves are standing in boats soaring and dipping on turbulent seas."

To work, the beams in the accelerators will have to be very stable and precisely positioned. If the beams bump around too much, the "golden orbit" will fizzle. For some accelerator designs, "too much" is a mere 0.3 nanometers of vibration (a mere three-tenths of a billionth of a meter).

Accordingly, Shiltsev, along with Fermilab physicist and amateur geologist Joe Lach and physicists from the Budker Institute of Nuclear Physics in Novosibirsk, Russia, set out to test whether the ground in Batavia is too turbulent a sea for future adventures in the high-energy frontier.

The physicists measured the earth's motion at frequencies from 0.01 to a few hundred Hertz—whether from natural or "unnatural" causes—both on the surface and in the accelerator tunnel, as well as deep in a nearby mine (since at least one of the proposed accelerators might be built underground in the dolomite rock layer).

About 250 feet below the ground in the Conco Western Stone Quarry in North Aurora, just as one might expect, all was relatively quiet on weekends. In fact, it was so quiet that the researchers' seismic probes picked up the famous "seven-second hum," created, remarkably, by the waves of the Atlantic Ocean beating on the eastern shoreline. The probes also picked up the footsteps, and the minute vibrations they prompted, of a solitary miner walking about on a Sunday evening 100 feet away.

Minute ground vibrations need to be factored into the designs of future colliders.

Over in a tunnel dug for the Metropolitan Water Reclamation District of Greater Chicago, the physicists observed underground motion at frequencies between one and 100 Hertz coming from rush-hour traffic on Interstate 55, about half a mile away.

The probes in the tunnel also picked up rumblings of the earth from an earthquake as far away as Chile.

At Fermilab, seismic geophones on the surface of the ground clocked the oscillations caused by the workday schedule—including traffic patterns and even the drop in vibration levels when the Lab retires for its lunch break.

Probes at different locations—in the Tevatron tunnel and on the surface—recorded ground wave harmonics of 4.6 Hertz stemming from the operation of Fermilab's Central Helium Liquefier.

What do all these earthly palpitations mean for future accelerators?

"If you can see them, they're a problem," said Shiltsev. Only those too minute to detect would not disrupt the delicate beams of subatomic particles in future colliders.

Traffic patterns, workday activities, soil conditions, precipitation—all influence the vibrations of the earth. One major source of vibrations, Shiltsev said, is the accelerator itself: e.g., the vacuum systems, the stands the magnets sit on, the water that is pumped through to cool the magnets.

If the movement of the earth could somehow affect the entire collider at once, lifting and lowering its components all together, the beams would not suffer. But accelerators are strings of magnets and radiofrequency cavities, like sausage links, and vibrations affect different links differently. "If one part of the accelerator is moving up and another part is moving down, and especially if the different elements move abruptly, then we are in trouble," Shiltsev said.

Problems are worse for accelerators built near the surface, which, as the studies showed, is noisier than deeper dolomite layers. In fact, the level of movement that the researchers measured in the Tevatron tunnel, just 20 feet below the surface, is clearly too much for any of the future colliders.

But this doesn't mean, Lach explained, that next-generation colliders at Fermilab are all but ruled out. Rather, the researchers have concluded, the sensitive colliders contemplated for the future could happily coexist with the level of ground motion found in the underground mines. The task confronting designers of future accelerators is to understand the levels and sources of vibrations, minimize oscillations due to the accelerator's own components and build "corrector" systems to compensate for the not-so-good earth.

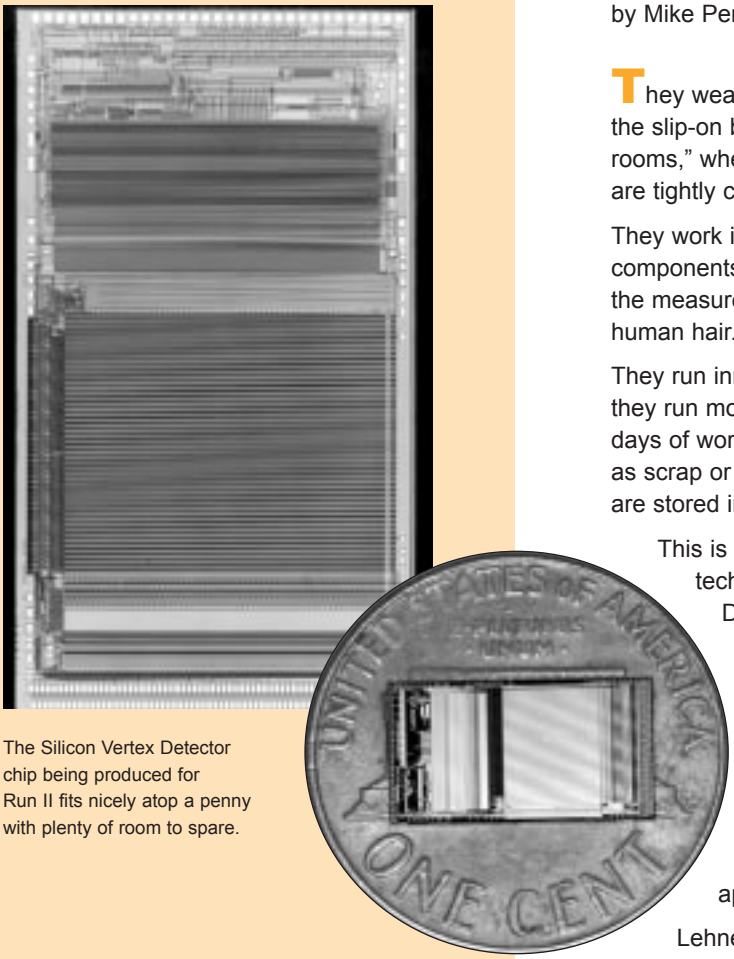
"You'd better know what you're dealing with before you start building," Lach said. And that's why the studies continue.

Traffic patterns are picked up by seismic probes half a mile away and 300 feet below the surface of the earth.

Physicists Vladimir Shiltsev (left) and Joe Lach are studying the sources and levels of ground motion that will affect the design of future high-energy accelerators.

Photos by Jenny Mullins

SiDet: The Next Generation



Photos by Reidar Hahn

The Silicon Vertex Detector chip being produced for Run II fits nicely atop a penny with plenty of room to spare.

by Mike Perricone

They wear funny hats, crinkly lab coats, masks and rubber gloves, and the slip-on booties mean their shoes don't soil the shiny floors of the "clean rooms," where the air is strictly filtered and the temperature and humidity are tightly controlled.

They work in the world's biggest facility of its kind, but some of the components they handle are scarcely bigger than the head of a pin, and the measurements they make are equivalent to fractions of the width of a human hair.

They run innumerable tests on the components they're building, and then they run more tests. If they cough when their masks are off, they can ruin days of work. Despite their painstaking efforts, many components still wind up as scrap or practice projects, while assemblies being successfully completed are stored in sealed plastic bins filled with dry nitrogen gas to forbid moisture.

This is life at Fermilab's SiDet Facility, producing the silicon detector technology for the next generation of particle physics at the CDF and DZero detectors.

The key work at SiDet is being done by the next generation of physicists: postdocs who are designing and building detector components, instead of adding their names to research papers that will get them noticed and appointed to long-term positions.

"Since postdocs have a limited contract, they have to apply for the next job after three years or so," said Frank Lehner, a postdoc from Germany. "The thing that counts most in the application process is scientific achievement."

Lehner is working on the 90-degree double-sided detectors used in the barrel surrounding the beamline. These are the last and most complex of the five types of silicon wafer detectors to achieve "proof of principle," meaning that the prototype definitely works.

"I came to Fermilab with the intention of doing Run II physics," said Lehner, who arrived in 1998 after working at DESY in Germany, and achieving his Ph.D. from the University of Hamburg. "It was obvious to me that the upgrade project has to be finished first before one can start taking or analyzing data and doing physics. I was fully aware of that point, and basically, I like the hardware work which I am doing."

The postdocs' reward must stem from their work, and from knowing they are enabling the pursuit of new discoveries in Run II, the collider run of the

YOUNG PHYSICISTS PLAY KEY ROLES in silicon detector production for RUN II.

Tevatron that will kick off the next millennium.

"Yes, physics analysis probably is more rewarding for a postdoc than getting the production started for Run II," admitted Peter Van Gemmeren, also from Germany, who graduated from the University of Siegen, and received his Ph.D. from the University of Mainz for work on the ALEPH experiment at CERN in Switzerland.

"But without a very big effort from everybody involved, we wouldn't be able to get prepared for Run II," continued Van Gemmeren, who worked on the fourth detector type to achieve proof of principle. "This (production) also has the advantage of involving all different kinds of physics work: first, planning and developing a detector, or a single component, building the prototype and testing it. Then getting the production started and writing the software tools, for example triggering or reconstruction, for each detector component. Then taking data and designing an analysis. And at the end, of course, publishing a result."

Fitting into the big picture works fine with the sunny outlook of Maria Roco, a Philippine native who did her graduate work at the University of Iowa and her Ph.D. thesis on the ZEUS experiment at DESY.

"It was not a hard choice for me, and I've been enjoying myself," said Roco, who for the last two years has worked on developing the Silicon Microstrip Tracker for DZero. "These production tasks are very important to the upgrade if DZero wants to have a working detector to do all the great physics it wants to do in Run II."

Roco and Cecilia Gerber are building the "ladders" that will go onto the SMT. Roco has been coordinating the assembly, production and quality testing of the nine-chip, double-sided ladders, while Gerber has been doing the same for three-chip, single-sided ladders. These rectangular devices sound simple, but they must be nearly weightless, bonded to readout chips smaller than a dime, and must precisely record particle paths during intense bombardments of particles from proton-antiproton collisions.

Photo by Jenny Mullins

These are not disguises; they're everyday working garb for (from left) Peter Van Gemmeren, Eric Kajfasz and Frank Lehner at Fermilab's SiDet facility. Here, the three postdocs use a microscope to check the condition of a silicon detector they are assembling.

Silicon detectors are extremely accurate and extremely hardy. CDF has used silicon detectors for years, in conjunction with a magnetic field in close proximity to the collision point. DZero will be using its first generation of silicon detectors, with its first magnetic field close to the collision point.

"What we do in high energy physics is like recording paths of pieces flying away from a car explosion, and then trying to figure out just what kind of car it was," said Bill Reay, who with Ron Lipton is a co-project manager for the DZero silicon efforts at SiDet.

“Without the work of these YOUNG PEOPLE,

Photo by Jenny Mullins

Kajfasz, Lehner and Van Gemmeren (left to right) take a break to compare notes. “Without the work of these young people, this project just wouldn’t get done,” says Bill Reay, co-leader of the DZero silicon upgrade at SiDet.

The goal is to identify particles traveling at the speed of light, moving only millimeters between birth and decay. With their unequalled accuracy (on the order of 1/10 the diameter of the human hair) and durability, silicon detectors can be placed right near the point of a particle collision where new particles are made, and used to track the products of decays that begin only a few millimeters away from the collision point.

Individual components are assembled into detectors at SiDet, housed in a former bubble chamber building plus additions called Labs B, C and D, all located out at the end of the fixed target area. Detectors can be rectangular or wedge-shaped, depending on their placement into barrels or disks within the overall detector assembly.

Segments called “barrels” (containing hundreds of ladders) will be located in a carbon-fiber tube resembling a cylinder about four feet long and a foot wide. Surrounding the beam line, this cylinder is the heart of CDF and DZero, those massive, 5,000-ton, forty-foot particle detectors that roll into the collision halls of the Tevatron.

The array of tiny detector and readout chips, and the cables emanating from them, will provide some 900,000 channels of information and about 90 percent of the data collected from the entire detector. Reading out such vast amounts of data is not an easy task. New postdoc Aurelio Juste and Fermilab associate scientist Marcel Demarteau, developing DZero’s complex data acquisition system, have reached the point of a single mistake in every hundred-trillion bits of data. They’re not satisfied; they want to do ten times better.

There are three types of barrel detectors providing the mountains of data: single-sided detectors with strips running parallel to the beamline; two-degree double-sided detectors with strips on a second side mounted at a two-degree angle to those on the first; and 90-degree double-sided detectors, with strips on the second side mounted at 90 degrees to those on the first. The first two types are in production; the 90-degree detectors will reach production stage in September.

Interspersed throughout the barrels are F-disks composed of detector wedges, resembling pizza slices with a bite out of the point. These are mounted perpendicular to the beam line and measure forward-going particles. Out beyond each end of the central cylinder are two H-disks, completing the measurement of forward-going tracks. They’re similar in shape to the F-disks, but much larger.

Eric Kajfasz, a staff member from the Centre de Physique des Particules de Marseille (France) is an

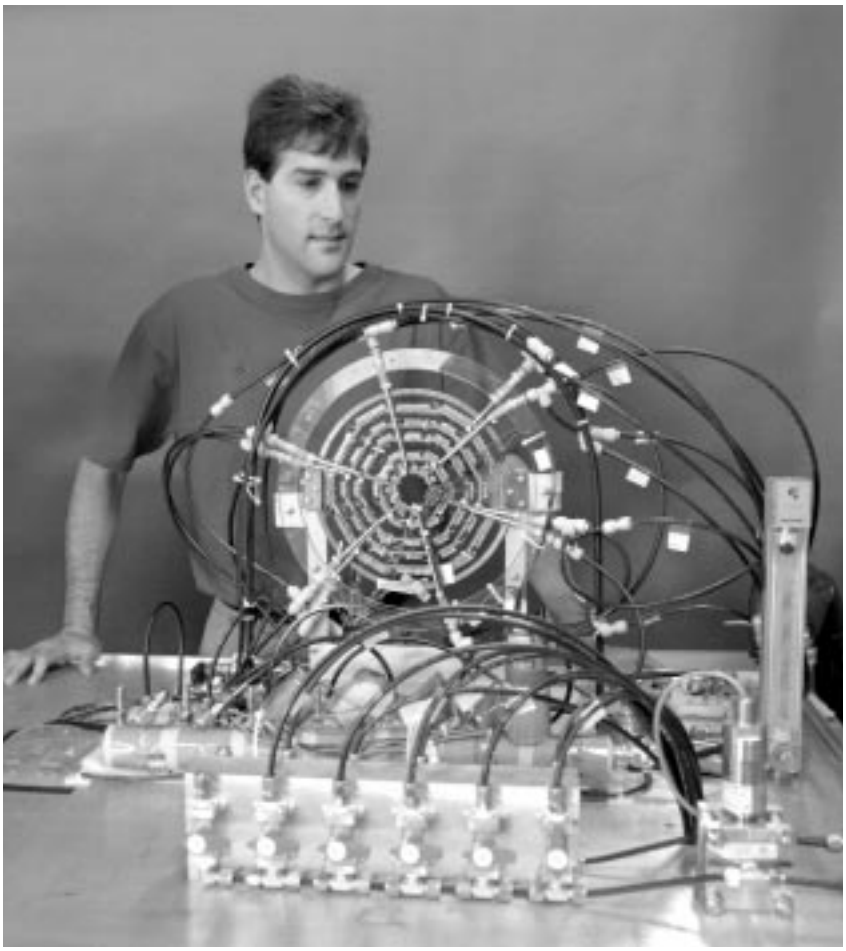
THIS PROJECT JUST WOULDN'T GET DONE."

old hand at silicon detector production. From 1992 to 1995, he worked on R&D, construction, bonding and testing of the ladders for the two barrels of the silicon microstrip detectors, then worked on the commissioning of those detectors first used at CDF (called SVX1). He returned in February 1998 as a DZero collaborator working on the next generation of silicon detectors.

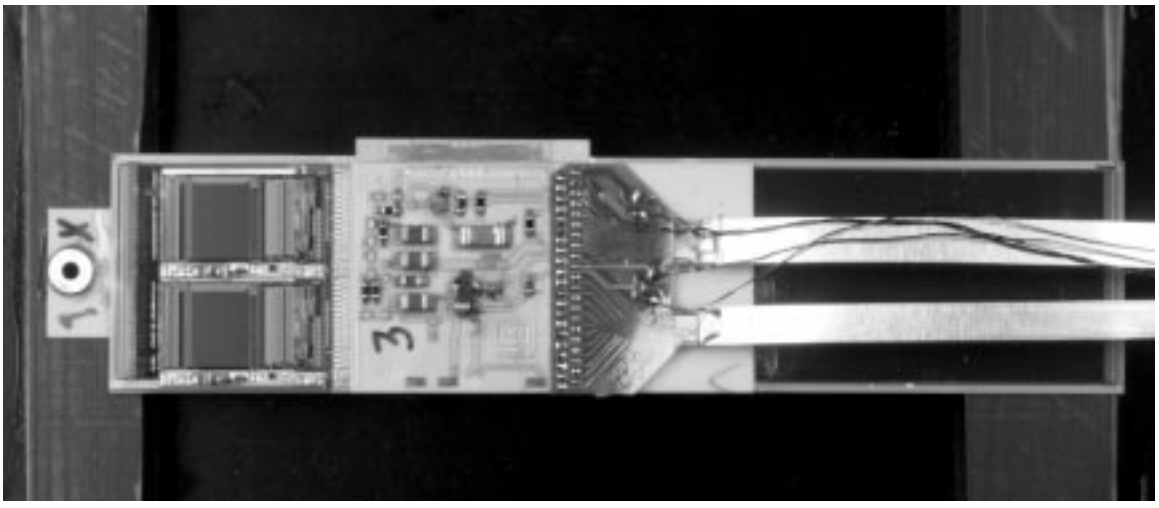
"With SVX1 we only had to build two barrels with a total of 96 ladders," he recalled. "The new DZero detector has six barrels, 12 F-disks and four H disks, with a total of 672 ladders and wedges. That's an order of magnitude more production than for SVX1—but without an order of magnitude more people working on it."

Just an order of magnitude more effort from those like Gerber, Juste, Kajfasz, Lehner, Roco, Van Gemmeren and many others.

"Without the work of these young people," Reay said, "this project just wouldn't get done."



Photos by Reidar Hahn



(Top) The silicon detectors must be kept cool during an experiment. Steve Blusk of the University of Rochester views the cooling test stand for chip and ladder assemblies to be used at CDF.

(Left) A silicon detector assembly with ladder, ready for installation.

LANNING
Lends a Hand With Learning

by Stephanie Holmes

Nancy Lanning is one of a kind.

Lanning is Fermilab's one and only Public Information Specialist. Along with working in the Education Department, and registering participants for the many classes held at the Lab, Lanning schedules and leads group tours of the site.

Originally an elementary school teacher in Minnesota, Lanning has been giving tours since she began working at Fermilab in 1988 as an on-call docent, volunteering her time at the Lederman Science Education Center. Two years later, she joined Public Information. She has been working there and with the Education Department for the past nine years.

Lanning's interest in physics extends back to her teaching days.

"I took a 'physics for elementary school teachers' type of class," she recalls. That piqued her interest, prompting her to do more reading. Since then, she has always been eager to learn more about physics.

Photo by Jenny Mullins

Nancy Lanning points out the attractions on Wilson Hall's 15th floor. Nearly 50,000 people come through Fermilab annually, whether on group tours, self-guided tours, or programs at the Science Education Center.

For Lanning, autumn and late spring are the busiest times of year.

"The adult tours generally consist of senior citizen groups, and (autumn and spring) are when they like to get out," she explains. With mostly senior citizens and students, Lanning says she gives about 40 tours per year, assisted by docents who also direct tours of the Lab.

Scheduling tours can be more complicated than simply setting a time and place to meet. Lanning notes that with the

TOUR GUIDE SPECIALIZES IN HELPING VISITORS FEEL AT HOME AT FERMILAB

student tours, she often has to work around bus schedules and school hours. Student tours are also challenging because most school groups want to come at the same time, around the end of the school year in May and June.

A self-guided tour is an alternative way to view the Lab. The self-guided tour rolls all the tours into one, starting out on the 15th floor of Wilson Hall, then moving to the first floor Atrium, and to other locations on the Fermilab site. The self-guided tour also allows visitors to spend as much time as they want in the areas that interest them, and to bypass areas that don't hold their attention.

The tours at Fermilab can be customized according to the interests of the group. For example, college students usually get view an experiment like the CDF or DZero particle detectors.

"I have to find a physicist who is willing to take the students there, and also be their guide," Lanning says. "I'm happy to talk about the buildings and the grounds, but I prefer a to have a physicist talk with them about the experiments."

Younger age groups usually stay near Wilson Hall and the Lederman Science Center. Lanning also knows a little bit about the prairie and would like to learn more with the possibility of starting prairie tours.

What do guests see when they are on a tour?

First, most groups head to the 15th floor observation area to see exhibits of the many facets of the Lab and the site, from the Native American artifacts discovered during site construction, to the Top Quark Discovery. There are also expansive views of the grounds, the buildings, the Tevatron and Main Injector rings, and, on a clear day, the Chicago skyline some 40 miles to the east.

After the 15th floor, visitors get to look at the art gallery and other displays on the first and second floors of Wilson Hall. After that, each group might head somewhere different. A health physics class might go to the Neutron Therapy facility, while an ecology class takes off for the prairie.

Photo by Fred Ullrich

Stephanie Holmes, 15, is the daughter of Fermilab scientists Steve Holmes and Cathy Newman-Holmes. Steve Holmes, formerly the head of the Beams Division and project manager for the Main Injector Project, is now Associate Director for Accelerators. Cathy Newman-Holmes is co-project manager for the CDF upgrade for Run II of the Tevatron.

"The groups are a lot of fun," says Lanning. Group tours must have at least 10 people, and no more than 40. Though the maximum is 40 people, a group of 25 is usually the most that one guide can handle alone. There are also pick-up tours, where several individuals or small groups combine to form a single group to view the Lab—just like a pick-up game on a playground.

Lanning admits that she sometimes finds herself saying the same things repeatedly, but counters that the variety of groups she meets makes each tour unique and interesting. "I had a kid faint once," she remembers.

Lanning enjoys her job. "Sometimes you just meet really nice people, and they're interested, and things just sort of click."

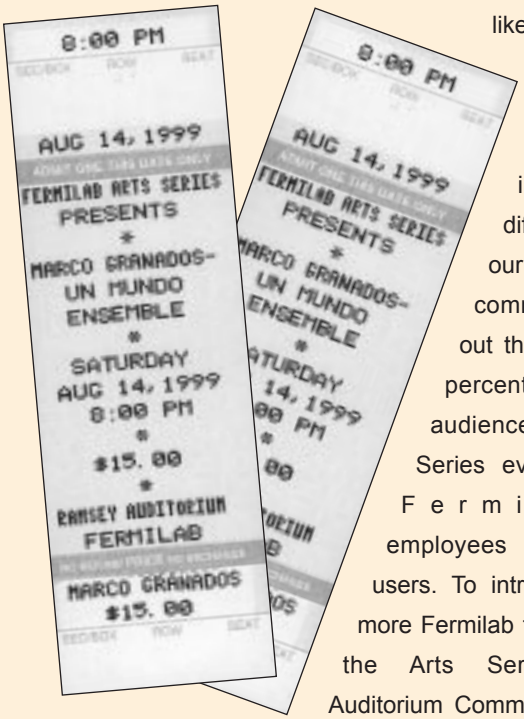
Anyone interested in going on an organized tour should call at least a week in advance to arrange it. Self-guided tour brochures are available at the information desk at the main entrance of Wilson Hall."

the talk of the lab

Twofers

People come to Fermilab for a lot more than physics. Fishermen and women, bird- and buffalo watchers, flotillas of Harley-Davidsons, and people who love tornadoes are among those who visit the lab during the course of the average year—all of them people who might not otherwise come to Fermilab.

The Fermilab Arts Series reaches still another group of 25,000 people annually. They come to Ramsey Auditorium to hear the likes of Koko Taylor, Ahmad Jamal, the Chenille Sisters and much more world-class talent. It's a great way to reach out to the community.



Now the Arts Series would like to try another form of outreach (or perhaps inreach) to a different group—our own Fermilab community. Turns out that only a small percentage of the audiences for Arts Series events are Fermilab employees and users. To introduce more Fermilab folks to the Arts Series, the Auditorium Committee is offering a two-for-one deal for its upcoming August 14 show featuring Marco Granadas and Un Mundo Ensemble. Buy one ticket, get one free, with no limit on the number you can buy.

Who are Marco Granados and the Un Mundo Ensemble? Granados is a Latin American flutist who, says the Arts Series brochure, is what you would get if you crossed "the flute-playing dexterity of James Galway with the Latin rhythms of the Gypsy Kings." As for Un Mundo Ensemble, it includes several of "the hottest Latin-American musicians performing today: Aquiles Baez on cuatro and guitar; Luis Gomez-Imbert on bass; and percussionist Leonardo Granados."

Fermilab's Janet Mackay-Galbraith, impresario of the Arts Series, says that Granados has a strong appeal to world music audiences—not to mention flute fans.

"I think this is a great chance for lab employees and users to sample some of the wonderful offerings presented right here in our own back yard," Mackay-Galbraith said. "We often find that we get performers here at Fermilab just before they get really big— and out of our price range. I think Granados is probably going to be in that category, so this is a great opportunity to hear him. And with the twofer deal, the price is definitely right."

Granados not only plays the flute; he also does a mean Web page: http://sunflute.com/

Buy tickets for the August 14 Marco Granados concert at the front desk in Wilson Hall or by phone at 2787.

— Judy Jackson

CALENDAR

Web site for Fermilab events: http://www.fnal.gov/faw/events.html

AUG 13

International Film Society Presents: *Smoke Signals* Dir: Chris Eyre, (USA, 1998, 88 mins). Film at 8 p.m., Ramsey Auditorium, Wilson Hall, $4. (630) 840-8000. http://www.fnal.gov/culture/film_society.html

AUG 14

Art Series presents: Marco Granados & Un Mundo Ensemble, $15. Performances begin at 8 p.m. in Ramsey Auditorium, Wilson Hall. For tickets call (630) 840-ARTS.

ONGOING

English Classes, Thursdays at the Users' Center, 10–11:30, free classes. NALWO coffee for newcomers & visitors every Thursday at the Users' Center, 10:30–12, children welcome. In the auditorium, International folk dancing, Thursdays, 7:30–10 p.m., call Mady, (630) 584–0825; Scottish country dancing Tuesdays, 7:30–9:30 p.m., call Doug, x8194 or e-mail folkdance@fnal.gov.

LAB NOTE

Fermilab Employees, Contractors, Grad Students, Retirees, & Users

For one performance only, on August 14, Fermilab related personnel are entitled to a buy-one, get-one-free ticket for the performance by Marco Granados and Un Mundo Ensemble. To take advantage of this offer, simply present your ID card at the box office (Atrium Desk, Wilson Hall during business hours).You must obtain your tickets in advance — this offer will not be valid at the door. Marco Granados combines the flute playing dexterity of James Galway with the Latin rhythms of the Gypsy Kings. This native of Venezuela maintains an active international career as a soloist, chamber musician and teacher,performing the classics to folk, jazz and Twentieth-Century music. Marco Granados and his trio, Un Mundo Ensemble, are gathering acclaim the world over for their performance of Latin and Latin-American Music. Marco Granados has been featured on NPR's Performance Today with Camerata Latinoamericano, a group that includes the incomparable Paquito D'Rivera. He has also collaborated with flutists Ransom Wilson and William Bennett, harpist Nancy Allen and oboist Heinz Holliger. Un Mundo Ensemble includes some of the hottest Latin-American Musicians performing today: Aquiles Baez on cuatro and guitar; Luis Gomez-Imbert on bass; and percussionist Leonardo Granados.

Lunch served from 11:30 a.m. to 1 p.m.
$8/person

Dinner served at 7 p.m.
$20/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

Lunch
Wednesday, August 11

Grilled Salmon with Parsley and Cucumber Salsa

Potato Fonseca

Vegetable of the Season

Fresh Fruit Compote

Dinner
Thursday, August 12

Pasta Carbonara

Beef Tenderloin with Balsamic Vinegar Sauce

Vegetable of the Season

Blueberry Tart

Lunch
Wednesday, August 18

Grilled Beef, Vegetable and Rice Noodle Salad

Cold Lime Souffle with Kiwi Sauce

Dinner
Thursday, August 19

Spinach with Shrimp, Bacon and Red Pepper

Grilled Pork Tenderloin with Peach and Ginger Sauce

Wild Rice with Mushrooms

Fruit Filled Profiteroles

FERMI NEWS

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The deadline for the Friday, August 20, 1999, issue is Tuesday, August 10, 1999. Please send classified advertisements 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. Letters from readers are welcome. Please include your name and daytime phone number.

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CLASSIFIEDS

FOR SALE

■ ’95 Ford Windstar, blue, 76K miles, power everything, seats 7, runs great, $8,200. Call Mike x2652 or mkaiser@fnal.gov.

■ ’95 Dodge Neon 4dr sedan, 60K miles, 5 spd, 2 airbags, A/C, power locks/windows/mirrors, very good cond.,$5,500 Andreas x5016 or heiss@fnal.gov.

■ ’89 Ford Taurus 4dr GL Sedan, sandalwood, 94K miles, auto, loaded, orig. owner, good cond., new brakes, $2,500. Call x5489 or chou@fnal.gov.

■ ’88 Mazda 626, 4 drs, 5 spd shift, am/fm cassette, recent tires, 150K miles, good cond., $1,500 obo. Frederic, x5631 or (815)372-1404.

■ ’87 Nissan Sentra, 2 drs, silver, 5 spd, 155K miles, needs brakes & muffler in 2-3 mos, still reliable, new tires, some rust, $800. Call x2573 or neeti@fnal.gov.

■ ’87 Honda Civic, 4 dr, 5 spd shift, 122K miles, reliable, runs great, well maintd, $2,100 obo. See http://www.pa.msu.edu/~balazs/Elmo/. Csaba, x3438, x3667 or balazs@fnal.gov.

■ ’86 BMW 325ES 2 dr, red sport sedan: 5 spd, loaded, sunroof, am/fm/cassette quad system, alarm. New brakes, rotors, water pump, belts, alternator, & battery. 211k miles well maintd, $2,000. Pierrick x8594 or hanlet@fnal.gov

■ ’85 Toyota Camry LE 5-dr Hatchback, fits bikes/skis, 97K miles, a/c, power locks/windows, all maint. records, runs great, $1,500 obo. Zoltan, x6381 or zoltan@fnal.gov.

■ Tonneau cover for short bed Chevy. Blk, snaps on to removable framework, exc. cond., $100 markl@fnal.gov, Mark x4776.

■ Ladies Andrew Marc lamb leather bomber jacket w/Opossum lining, brn, med - $500; ladies Andrew Marc lamb leather jacket w/Opossum lining, blk, sml, $250; NordicRider, $150; NordicTrack cross country ski machine, $200; x3644 or (815)729-9072.

■ Springsteen Tix (2), United Center, Sep.28, section 306, row 14-5A&6A, $100 ea. Call Bill. x4173.

■ 4 Computer chairs $5 each, 1 large dog cage $30, 1 entertainment center storage top and bottom $50,1 set of bunk beds, drawer on bottom $50. All in good condition. Don Rissman, 896-3211.

RENT

■ APT, St. Charles: spacious 2 bdrm, carpeting, fridge, a/c, tile floor, central heat, convenient location, sound & fire proof, laundry rm & onsite storage, $725. Barb Petkus (630)584-4686 or 573-4619; or bpetkus@aol.com

LETTER TO THE EDITOR

I had the opportunity to attend the recent New Perspectives 1999 conference sponsored by the Fermilab GSA (July 9-10). The conference was a very impressive meeting, with a mixture of talks by senior scientists and short talks by graduate students about their research. I was struck by the high quality of the student talks and the posters in the poster session the afternoon before the conference, as well as the smooth organization of the meeting. Not surprisingly, attendance varied from session to session because of undoubted commitments to running experiments, but the audiences were attentive and asked sharp questions of the speakers. The GSA under the leadership of Maria Spiropulu is to be congratulated on a fine job.

J.D. Jackson

cc: Michael Witherell

MILESTONES

RETIRING

Byron Rodewalt ID #1535 of the PPD-Engineering & Tech Team, on August 16, 1999

James Seeman ID #2340 of the PPD–Engineering & Tech, on August 23.

Edward Frazier, ID #745 of the PPD-Technical Centers, on September 24.

D. Walsh, ID #2148 of the CD-Online and Database Systems, on October 29.

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