

# Fermi News

Fermi National Accelerator Laboratory

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Number 10



Operator Denton Morris connects electrical power source to Lambertson magnet that extracts proton beam from the Tevatron.

## Countdown to Fixed Target

GETTING READY TO RUN

*Another in a series of stories on work leading up to this summer's fixed-target run.*

by Judy Jackson, Office of Public Affairs

"At this moment," Fermilab Director John Peoples told the House Subcommittee on Energy and Environment in testimony delivered in Washington on May 8, "Fermilab is in the midst of the transition from collider operations to fixed-target operations. In June, we will begin extracting a beam of protons from the Tevatron, the highest-energy external beam in the world. By directing this beam onto eight targets we will create eight distinct particle beams that will in turn support 10 unique experiments. Although fixed-target experiments cannot explore the high-energy frontier of particle physics as Tevatron collider experi-

ments do, they probe very precise questions about subtle, unexplained phenomena discovered at lower energy."

Back in Batavia, Fermilab staff and users were feverishly preparing for the fixed-target run scheduled to begin on July 1. Since Collider Run I ended in February, members of the Accelerator, Computing and Research Divisions and the Facilities Engineering Services and Physics Sections have directed their energies toward delivering beam to 550 fixed-target experimenters by the target date. The users, in turn, are getting their experiments ready for delivery of the beam when it turns on.

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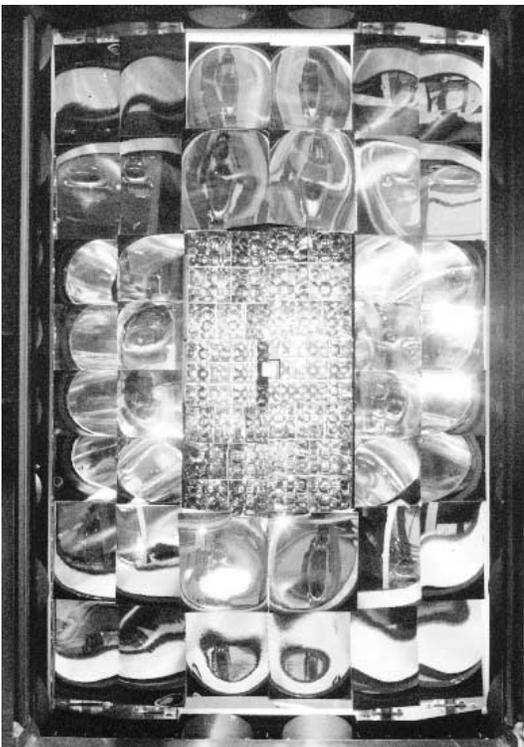
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Marianne Bossert writing her story after the kids' science press conference. Photo by Cristina Rodriguez, another FermiKid.



Ned Goldwasser, a professor at the University of Illinois and Fermilab's first deputy director, pictured in the late 1960s.



A Cerenkov counter, which the Illinois team built for E687.

# From the Ground Up: The University of Illinois and Fermilab

Members of the high-energy physics group at Illinois have played a role in developing Fermilab itself, as well as some of its most important experiments.

*by Donald Sena, Office of Public Affairs*

The relationship between the University of Illinois and Fermi National Accelerator Laboratory began even before the first experiment halls were built on the Batavia campus in the late 1960s. Bob Wilson, the newly designated director of the National Accelerator Laboratory (later renamed for Enrico Fermi), placed a phone call to Ned Goldwasser, then a professor at Illinois, asking him to be his deputy director and to help develop what would become the nation's foremost accelerator facility.

Goldwasser accepted the challenge, and the university followed his lead, participating in early and influential high-energy physics experiments at Fermilab. Today, that relationship continues to flourish with a new generation of Illinois physicists conducting research at the energy frontier in both collider and fixed-target studies.

## A Historical Perspective

Goldwasser, who served 11 years as deputy director, worked closely with Wilson on all aspects of the Laboratory's development, including building the experimental program and making the research institution a user-based facility. Goldwasser believed the success of the Laboratory rested in its ability to serve university groups from around the world.

"We decided early on that the only way particle physics research was going to work was if the universities played an integral part in the design and development [of the lab] and in the actual experimentation," instead

of a huge national laboratory staff doing it all, said Goldwasser.

His vision of nearly 30 years ago still affects every institution doing research at Fermilab, including the University of Illinois.

Tom O'Halloran and Al Wattenberg, two former Illinois professors, worked with Wonyong Lee of Columbia on Experiment 87, a well-known study at Fermilab. This series of experiments in the wide-band photon beam was the first study to observe the photoproduction of the  $J/\psi$  meson, and the collaboration reported the first sighting of a charmed baryon. Jim Wiss, now a professor at Illinois, joined E87A as a postdoc. That line of experimentation led to E400, the hadroproduction of charmed particles with neutrons. Fermilab Director John Peoples was the first spokesman for that study, followed by Wiss.

E87 laid the groundwork for future experiments with similar themes, including E687 and E831. The former continued the photoproduction of charmed particles, using a microstrip detector to isolate the particles. Collaborators have published about 30 papers from E687 results, and scientists are still publishing work.

"It's a fairly productive program in the fixed-target area," said Wiss.

Specifically, the Illinois team built the Cerenkov counter for the experiment. In a vacuum, nothing travels faster than the speed of light; however, particles can travel faster than light in certain media. For instance, if particles move faster than the speed

of light in a gas, a burst of Cerenkov light occurs, similar to the sonic boom that occurs when an object travels faster than the speed of sound. The counter, used for particle identification, measures the velocity of particles.

Illinois also developed the E687 Monte Carlo computer program used to correct data during analysis. Wiss said nearly all high-energy physics experiments now use a form of the Monte Carlo program.

The next step in this progression of experiments is E831, one of the studies getting ready to run this summer as part of the new fixed-target program. The experiment will run at a higher intensity and slightly lower photon energy, and researchers expect to increase the charm yield by a factor of 10 over E687. The Illinois team—one professor, one postdoc and about three students—is building the inner-muon system.

On yet another line of experimentation, George Gollin led an Illinois team that worked in the Kaon program. Specifically, Gollin was the spokesman for E773. Experimenters are still publishing papers from this study.

## Collision Course

Along with fixed-target work, the University of Illinois has collaborated on the Collider Detector at Fermilab project (CDF) since its inception in the late 1970s. Lee Holloway, a professor at Illinois, designed and built the original central muon system, including the muon trigger, for CDF's maiden run. Steve Errede, another Illini professor, joined CDF in the mid-1980s and built the central drift tubes that sit just outside the tracking chamber. Tony Liss, now a professor at Illinois, joined CDF as a postdoc at the University of Chicago in 1984, a year and a half before the detector first saw collisions. He said it was exciting to help build the massive yet delicate physics tool from the ground up. He said he thought at the time that CDF seemed like a sure bet for success. When asked if he hopes to continue with the CDF collaboration, the professor is quick to answer.

"I still think it's by far the most exciting physics around; I will be in

CDF until I die," Liss said with a laugh.

From 1988 to 1992, Liss and the Illinois team helped design, build and install a major upgrade to the CDF central muon system. Muons are leptons, like electrons, but much more massive. They undergo only weak and electromagnetic interactions and can penetrate great distances in dense materials. To detect muons, experimenters must absorb just about everything else with layers of steel. If a charged particle emerges from the steel, it usually is a muon.

Twelve Illinois students have received doctorates for their work on CDF. In Run I, Illinois was heavily involved in the search for the top

quark. From 1993 to 1995, Liss served as one of two "conveners" of the CDF top analysis group. A convener's main role is to coordinate the analysis for a particular area of research, in this case the search for the top quark. Liss was one of two main editors of the "evidence for the top quark" paper submitted in 1994. His tenure as top convener ended just before the "observation" paper in March, 1995.

Liss said there are more exciting times ahead for CDF and the University of Illinois. The university group is working to upgrade the front-end electronics and triggers for the muon system, as well as helping

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Two University of Illinois graduate students, Andrew Martin (left) and Randy Keup, work on the CDF's muon system in 1991.

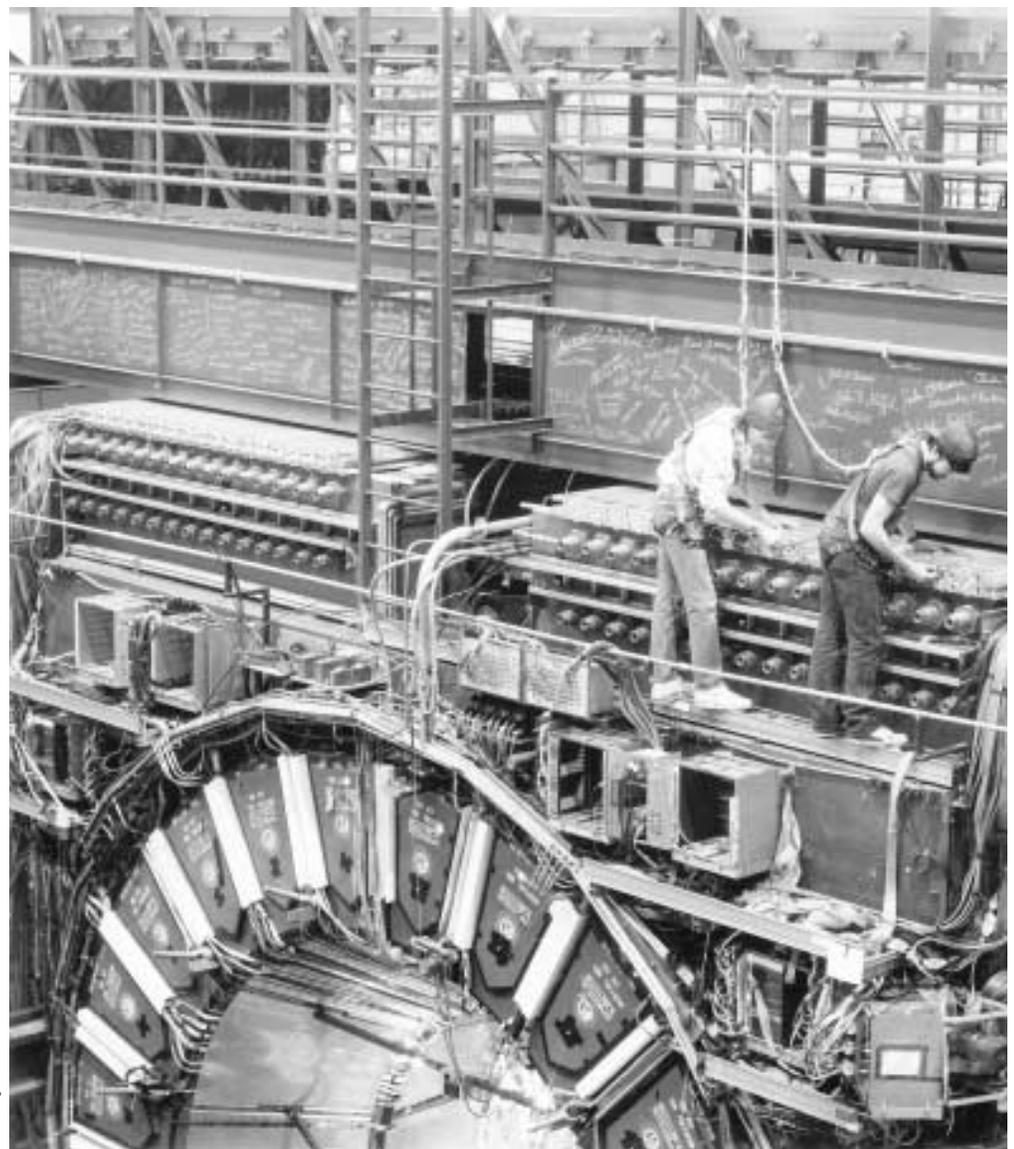


Photo by Reidar Hahn

# Tollestrup Elected to National Academy

Fermilab Physicist Recognized for Scientific Achievement



Photo by Fermilab Visual Media Services

Fermilab physicist Alvin Tollestrup, recently elected to the National Academy of Sciences.

**“ I am very pleased to hear of Alvin’s election to the National Academy. It is an honor that is long, long overdue. It is not only an honor for Alvin but a recognition of the excellence of science at Fermilab.”**

~ Fermilab Director Emeritus  
Leon Lederman

*by Judy Jackson, Office of Public Affairs*

The National Academy of Sciences on April 30 announced the election of Fermilab physicist Alvin Tollestrup to membership in the Academy. Tollestrup is one of 60 new members and 15 foreign associates chosen “in recognition of their distinguished and continuing achievements in original research.” Election to the Academy is considered one of the highest honors a U.S. scientist can attain.

Tollestrup has made central contributions to particle physics research at Fermilab. In 1989, along with three other Fermilab scientists, he won the National Medal of Technology in recognition of his pioneering work on Tevatron magnets. “When I got here in the mid seventies,” Tollestrup said, recalling early work on the accelerator design, “I ran a conference on colliding beams for Bob [Wilson]. I thought colliding beams looked like fun. Before the conference, the Tevatron was on the roof of the Main Ring. After the conference, it came down from the roof to the tunnel, under the Main Ring.”

Tollestrup, a founding member of the CDF collaboration, served as head of the CDF Department and later as spokesperson, from the experiment’s inception until 1992. In 1994, CDF announced the first evidence for the top quark, and in 1995, along with the DZero collaboration, confirmed the particle’s discovery.

“I am very pleased to hear of Alvin’s election to the National Academy,” said Fermilab Director Emeritus Leon Lederman. “It is an honor that is long, long overdue. It is not only an honor for Alvin but a recognition of the excellence of science at Fermilab—and it serves to reduce the average age of the members.”

John Peoples, Fermilab director, also said Tollestrup’s election was a significant achievement for the physicist.

“It’s marvelous recognition for him. Alvin has been a leader in high-energy physics for more than 30 years, and, in his most recent 20 years at Fermilab, his accomplishments have been incredible.” ■

# When Symmetries Collide

Bill Bardeen Receives Sakurai Prize for Theoretical Particle Physics

by Judy Jackson, Office of Public Affairs

“He lived his life and practiced his physics with great enthusiasm and joy. It is an honor to receive the prize established in his name,” Fermilab theoretical physicist Bill Bardeen told an audience of physicists, on accepting the Sakurai Prize for Theoretical Particle Physics. Bardeen spoke on May 4 during the prize-winners’ session of the Spring Meeting of the American Physical Society in Indianapolis.

The prize, endowed in 1984 as a memorial to the noted Japanese-American particle physics theorist J. J. Sakurai, consists of \$5,000 and a certificate citing the contributions made by the recipient. The Society awarded the Sakurai Prize to Bardeen “for fundamental insights into the structure and meaning of the axial anomaly and for contributions to the understanding of perturbative quantum chromodynamics.”

In his half-hour talk, Bardeen described his work on anomalies in particle physics theory in terms of the underlying concept of symmetry, a property of systems whereby the system appears unchanged when looked at from different reference frames or coordinate systems. Anomalies, he said, have great significance for the understanding of particle physics, because “they represent clashing symmetries. Understanding the anomalies that result when symmetries clash helps us know which theories make sense, and which don’t; and helps us decide which theoretical directions to pursue.”

Bardeen began his exploration of anomalies at the Institute for Advanced Study in Princeton. His wife had reminded him, he said, that during the time he was making these calculations he would disappear to his office for long periods in the evening—anomalous behavior for this self-described morning person. “The fog would rise, it was late at night, it was like being in a dream world. I almost imagined I was in the state of some feudal prince who supported a few physicists for his diversion.”

Bardeen concluded his address with the observation of the continuing significance of the study of anomalies, particularly in applications of quantum field theory and the development of the area of physics known as string theory. He said that when he began his work in the late 1960s he knew it was of fundamental significance but did not then fully appreciate the breadth of its impact on physics.

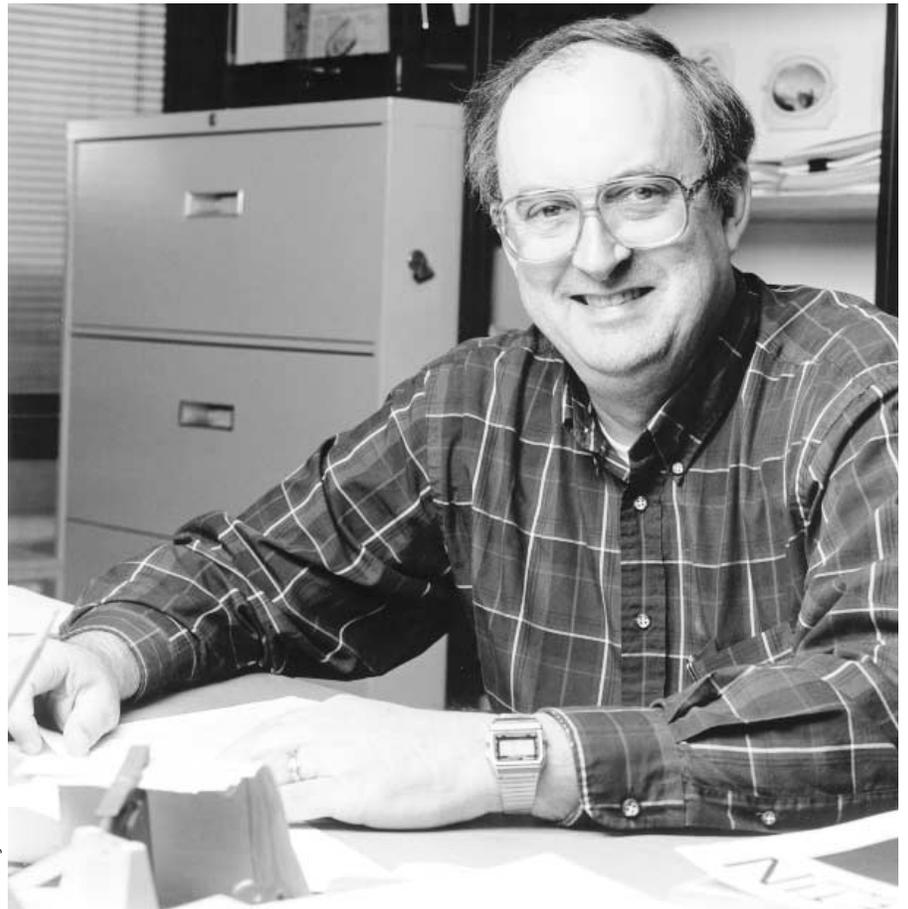


Photo by Reidar Hahn

Bardeen’s remarks followed talks by physicist Martin Perl, winner of the Nobel Prize in Physics in 1995 for his discovery of the tau lepton; and by Roy Schwitters and Gail Hanson, winners of the W. H. Panofsky Prize. Schwitters, a former spokesperson of CDF, directed the Superconducting Super Collider until Congress canceled the project in 1994. Hanson serves on the Fermilab Board of Overseers. ■

Fermilab theorist Bill Bardeen, winner of the J.J. Sakurai Prize

**Sakurai “lived his life and practiced his physics with great enthusiasm and joy. It is an honor to receive the prize established in his name.”**

~ Bill Bardeen

# “Take Your Daughters and Sons to Work Day” at Fermilab

by Donald Sena, Office of Public Affairs

They were science journalists, botanists, bird-watchers and tree-planters over the course of one day, interviewing prominent physicists, producing a publication and World Wide Web page, learning about woodland flowers and watching a banana freeze.

These people were not Zelig-like characters in some bizarre science fiction movie, but, rather, the nearly 150 children, grandchildren, stepchildren, nieces and nephews of Fermilab employees and users participating in “Take Your Daughters and Sons to Work Day” on April 25 at Fermilab. Though attending different activities during the day, all of the “FermiKids” left with a deeper understanding of physics and the environment and more knowledge about what a career in science entails.

“I think it was a very successful day,” said Marge Bardeen, head of the Leon M. Lederman Science Education Center. “Judging by the reactions of the children and parents that I saw, they enjoyed themselves very much.”

The children began the day shadowing their parents, learning what they do and whom they work with. After a special lunch in the cafeteria, the kids chose among three afternoon activities. Some planted trees in an early celebration of Arbor Day, April 26. Mike Becker, of Roads and Grounds, said about 175 people planted trees or shrubs, with children about one-quarter of the crowd. Another group of more than 30 children and their parents participated in two nature walks. Prairie consultant Robert Betz conducted a woodland tour, while Peter Kasper, of the Research Division, led a bird-watching group.

## Kids as Science Journalists

At Wilson Hall, nearly 30 kids became science writers, attending the “Kids as Science Journalists” press conference. Two separate groups of children interviewed Fermilab physicists and technicians about their jobs. Armed with such questions as: “What do you do every day?” to “Why do you like being a scientist?” to “How much money do you make?” the children probed the minds of four scientists—Roger Dixon, head of the Research Division, Cathy Newman Holmes of CDF, Wyatt Merritt of DZero and Sharon Austin of the Research Division. Two children shot photographs with

special digital cameras, capturing the event in full swing. After the interviews, the kids wrote their stories, giving impressions of the scientists and providing an overview of their day at Fermilab. The Office of Public Affairs compiled the stories and photographs into a special edition of *FermiNews* for the kids to take home and share with their friends, teachers and classmates. Liz Quigg, of the Computing Division, and Bardeen also created a page on the World Wide Web, containing the students’ writing and pictures.

(The web address is: [http://www-ed.fnal.gov/FermiKids/front\\_page.html](http://www-ed.fnal.gov/FermiKids/front_page.html))

## A Cool Event

After the three afternoon activities, the children packed the One West conference room for a standing-room-only cryogenics demonstration by Mike Urso, an engineer in the Research Division. Using liquid nitrogen, Urso froze ordinary items, including a banana, to teach the children about the effects of very cold temperature on matter.

The day ended with the children and their parents visiting the Lederman Science Center for various science exhibits, including Randy Ruchti’s portable cosmic ray detector.

As they filed out of Wilson Hall, the long day behind them, the children said they had fun, while learning about science and what a career in science would be like. Niki Lopez, 14, from Batavia Middle School, summarized the day with her story in the special *FermiNews*: “Fermilab. All I can say is, ‘Wow, what a place!’ My day was very exciting...I definitely would love to work here, no doubt about it. And if you think it’s hard work at Fermilab, well, straight from Roger Dixon’s mouth: ‘Nothing is too hard if you truly enjoy it.’” ■

“ Fermilab.

All I can say is, ‘Wow, what a place!’ My day was very exciting. I definitely would love to work here no doubt about it

~ Niki Lopez, 14,  
Batavia Middle School

A FermiKid at the “Kids as Journalists” press conference.





Another "FermiKid" decipheres her notes to write a story in the special *FermiNews* edition done as part of the day's festivities.



Kevin Bock as a *FermiNews* photographer.



John Foster, a Fermilab volunteer, shows children scintillating fiber for their science stories.



Scott and Jenna Holm help celebrate Arbor Day by planting a tree at Fermilab.



A participant in the "Kids as Science Journalists" event at Fermilab, writing his story underneath the site model on the 15th floor of Wilson Hall.

Reidar Hahn and his son Andrei at the Arbor Day tree planting.



Mike Urso performs his famous cryogenics demonstration to a fullhouse in the One West conference room in Wilson Hall on "Take Your Daughters and Sons To Work Day."

*This week:*  
The Accelerator and Computing Divisions and the Facilities Engineering Services Section.  
*Next issue:*  
The Research Division, Physics Section and the experiments.

## Countdown to Fixed Target

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### Delivering beam

Every Monday at 2:00 p.m. the Accelerator Division holds a meeting to discuss progress on the changeover from collider to fixed-target operations. Every shift of every day between now and startup includes carefully choreographed tasks in preparation for the new run. Based on staff members' reports of their progress, managers update the division's transition schedule.

Operations Department Head Robert Mau and Run Coordinator Craig Moore expect to have the accelerator complex ready to send

beam to the experiments well ahead of schedule. They would like to extract 800 GeV beam to the Switchyard beam dump on Memorial Day, Mau said, adding quickly, "That's an optimistic schedule. It would be a dream come true."

Partly, their progress depends on the weather. The civil construction site for the transfer line for the new Main Injector is too close to the Booster to allow beam to circulate in the Booster while construction workers are at work on the transfer line. "If it rains and the contractors can't

work, we can turn on the beam," Mau explained. Otherwise, the staff must operate the Booster beam only at night when construction workers go home, turning beam off before they return. Since the Booster is a critical link in the injection chain for the Tevatron, this off-and-on schedule introduces a complication in the restarting of the accelerator complex. "We're a flexible division," said Mau. "We'll manage."

Plans called for securing the Main Ring tunnel on May 17, searching to make sure no people remain in the tunnel when the beam turns on. "We'll definitely be hiding dummies," Mau said, referring to the practice of con-

cealing life-size mannequins in the tunnel to monitor the thoroughness of the sweep.

One of the biggest challenges, Moore declared, is the "fast spill" that the accelerator will provide to Experiment E815 in the coming run. In a fast spill, many high-energy protons are quickly extracted from the Tevatron, in contrast to the lower delivery rate of the "slow spill" that most experiments require. "We haven't done high-intensity fast spills for eight or nine years," Moore said. "We don't have many veterans who have done it before." The division has installed new hardware and software to achieve the fast spill at high beam intensity.

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**Fixed-target experiments "probe very precise questions about subtle, unexplained phenomena discovered at lower energy."**

~ John Peoples, Fermilab director

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Meeting the experiments' intensity requests will pose another challenge. "The record peak intensity, measured in protons per pulse, is 1.8 [or 18 trillion]," Mau said. "Now the experiments would like 3.5. We will have to break through existing records."

Clearly, Moore and Mau relish the challenge. "We'll know that we're up and running and taking data when we get our first complaints about spill quality and intensity," said Mau. He wonderingly described the euphoria of Accelerator staff at the successful start of a new run. "People work their tails off doing everything possible to make sure the beam goes around the way it's supposed to," he said. "When it does, they're still amazed."

### But will it compute?

"I think we're going to do well," said Vicky White, deputy head of the Computing Division. "We've been planning for more than three years, working, thinking, organizing. We are better prepared than we have ever been. I'm confident we can cope." She paused, biting her lip. "Of course, we anticipate changes when operations begin. We know we have to stay flexible. It is possible the DART system could have problems. There could be hardware problems. But we have enough depth to work our way out."

White and the staff of the Computing Division are confidently, if somewhat nervously, awaiting the culmination of years of effort to help the fixed-target experiments acquire,

Photo by Reidar Hahn



Craig Moore and Salah Chaurize examine septa in the Switchyard that split beam between meson and neutrino.

process and analyze data. The DART project represents a large share of that effort. “DART? Actually it stands for Data Acquisition Fixed Target,” project manager Ruth Pordes explained. “But we couldn’t call it DAFT, could we?” All of the new fixed-target experiments except E862 and E866 will use the new data acquisition system, the product of years’-long collaboration between experimenters and Computing Division staff. DART software will undergo one more upgrade—its fifth—before the run begins.

In the final weeks before running, Computing Division staff are meeting with experimenters to discuss operations and logistics, how to deal with computing issues as they arise, what to do and whom to call if trouble strikes. Tours of the PREP area, the Computing Division’s central cache of electronics and computing equipment, show experimenters where to find what they need in a hurry, especially after hours. “We hope that people have had the foresight to think ahead about what they want,” worried White. “If they all rush to the cupboard for things they’ve forgotten about, the cupboard may be bare.”

Other Computing Division efforts involve networking upgrades in the fixed-target area to provide higher bandwidth for transmission of data from the experiments’ counting rooms to the Feynman Computing Center; preparation for handling data after it arrives; increases in the capacity of the data processing farms and in the use of robotic storage; the purchase, testing and diagnostics of new computing equipment for the experiments; and the reconditioning and testing of existing equipment. “We are in good shape,” said White, “although I hate to say that, because as soon as I do... Well, I’m sure it all won’t go perfectly smoothly, but we have a good spirit of cooperation with the experiments. We’ll be okay.”

## Reliable running

“The key to our shutdown operations is to increase the reliability of the 20-year-old stuff we’ve got here,” said David Nevin, head of the Facilities Engineering Services Section. He cited as an example his responsibility for the operation of 639 pumps acquired from 37 different manufacturers, most of whom have long since folded. Vibration analysis and laser alignment exemplify the predictive maintenance FESS performs to keep them all pumping, as part of the cooling system for the accelerators and beamlines when the run begins.

The need to keep cool also prompted a new Casey’s Pond addition to increase the volume of industrial cooling water from 36 to 48 million gallons. In a hot summer, Nevin

explained, the old water volume might not have sufficed to cool the fixed-target magnets. To guard against electrical failure, FESS replaced hardware holding static lines that accompany high-voltage electric lines. The static lines, which drain off electrical static and protect against lightning strikes, pass through metal links that had worn thin, raising the possibility that a static line might come loose and fall onto a high-voltage line, knocking out power to the accelerator.

FESS staff have checked the electrical feeders for the neutrino, proton, and meson beamlines, getting rid of rust and cleaning them after four years of disuse. “We’ve been clearing out the wasps’ nests and the raccoons’ lairs and chasing out the snakes,” Nevin said. The section has replaced beam pipes, repaired cranes, installed emergency lighting in the Switchyard, improved water systems, and put disused utilities in working order.

Like the Accelerator and Computing Divisions, FESS has a tightly orchestrated plan to bring activities to a successful conclusion. “Barring an act of God,” Nevin said, “we expect to finish on time—maybe even a week ahead of schedule.” ■



Photo by Reidar Hahn

FESS Section Head David Nevin points out the wear on a static-line holder. The Section replaced 48 of the worn pieces to guard against power outages during the fixed-target run.

Topher Cawfield, Amir Rahimi and Kee Su Park work on installation of E831. The next issue of FermiNews will report on E831 and other fixed-target experiments.



Photo by Reidar Hahn

## From the Ground Up: The University of Illinois and Fermilab

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to replace the central tracking chamber. The Main Injector, Fermilab's newest accelerator now being built, will greatly increase the luminosity, or number of particle collisions per second. Both detectors, CDF and DZero, will need upgrades to keep up with all those extra collisions. However, the Main Injector brings another challenge along with the higher luminosity—shorter bunch spacing.

The protons and antiprotons in the Tevatron gather into bunches and circulate around the ring in opposite directions. The Main Injector will provide more "crossings," or collision opportunities, between the proton and antiproton bunches. To keep the number of collisions per crossing to a level that the detectors can handle, there must be more bunches than in the past. As a result, there will be less time between bunch crossings. Experimenters at Illinois have been doing simulation work to understand better how the higher luminosity and shorter bunch spacing will affect the detectors' tracking systems.

### Student Benefit

Liss said he hopes to include many students, including undergraduates, in the upgrade work. He said when he built the muon upgrade for Run I, he employed nearly 15 undergraduate students.

"These kids are very enthusiastic and some are quite good in the lab," said Liss. "They get a good experience, and we get great help."

Liss noted Mark Vandracek as an example of an Illinois undergraduate who worked on the muon upgrade for Run I. Vandracek stayed on at Illinois and received a Ph.D. in physics for work on CDF.

Liss said he is optimistic about the future of high-energy physics at both Illinois and CDF. He said he is looking forward to having more top quarks to study, and possibly uncovering some new physics, thus gaining a better understanding of how the physical world works.

"You never know what might be out there, and that is really exciting," said the professor. ■

## FERMILAB CALENDAR

### MAY 17

Director John Peoples invites all employees, users, DOE and contractors to a Labwide party to celebrate the successful completion of Collider Run I and the start of the next fixed-target run, 3:30 - 6:30 p.m., Wilson Hall Atrium.

### MAY 20 -24

The Wellness Works Committee presents Bike-to-Work Week. Contact Merle Haldeman, x3958, Haldeman@fnal.gov.

### MAY 23

NALREC steak fry party. Kuhn Barn, 5:15-9:30 p.m. 10 oz. steak and trimmings (hot dogs too!) \$4. Free hay rides, if weather permits. Music by Crusin' the Loop. Call Alma Karas, x3452 or Bob Lootens, x3303.

### MAY 24

The Fermilab International Film Society presents "Latcho Drom" (Safe Journey). Through song and dance, gypsies across Europe and Asia tell of their long journeys, the anger directed at their people, and their own indomitable will. A sensory banquet of colorful costumes, lively dancers, and emotional songs. Dir: Tony Gatlif, France (1993). 103 min. 8 p.m. \$4. Ramsey Auditorium.

### JUNE 12

Wellness Works Committee Health Fair, 10 a.m. to 2 p.m. Wilson Hall Atrium.

### JUNE 13

Fermilab Lecture Series presents "From Simplicity to Complexity." If the fundamental description of the universe is simple, why is the world around us so complex? Is it really as complex as it appears? Nobel laureate Murray Gell-Mann examines these and other questions on the subject of complexity. Gell-Mann, author of *The Quark and the Jaguar*, won the Nobel Prize in physics for his work on the theory of elementary particles. His recent research at the Santa Fe Institute focuses on complex adaptive systems. Tickets \$5. 8 p.m., Ramsey Auditorium. Call (708) 840-ARTS for information and reservations.

# Chez Léon

M E N U

Lunch served from  
11:30 a.m. to 1 p.m.  
\$8 / person  
Dinner served at 7 p.m.  
\$20 / person

For reservations call x4512  
Dietary Restrictions  
Contact Tita, x3524

### Wednesday Lunch May 22

Dominican Beef with Onions,  
Peppers, Tomato and Cilantro  
Roasted Red Potatoes  
with Garlic and Mint  
Pineapple Creme Caramel

### Thursday Dinner May 23

Tortilla Lime  
and Chicken Soup  
Chipotle Shrimp  
with Corn Cakes and Salsa  
Crepes  
with Coffee Cinnamon Sauce

### Wednesday Lunch May 29

Quesadillas  
with Brie, Mango and Chilies  
Fresh Salsa Cruda  
Cold Coconut Mousse  
with Macaroons

### Thursday Dinner May 30

Eggplant, Squash and Tomato  
with Roasted Garlic Vinaigrette  
Grilled Rib Lamb Chops  
with Green Peppercorn Sauce  
Julienne of Carrots  
with Dill  
Potato Dauphinois  
Chocolate Soufflé

# Main Injector Reaches “Pass- Through”

The Main Injector project reached a milestone on May 8 when construction crews razed two walls that were isolating a small section of the tunnel, thus making Fermilab's newest particle accelerator an unbroken ring.

Employees of Wil-Freds, a contractor for the construction, removed the walls between 7 a.m. and 9 a.m. Workers had kept the last 300 feet or so of tunnel walled off from the rest of the ring until crews finished concrete work.

Before the walls came down—an event referred to as “pass-through”—the last section of tunnel was dank and dreary. The walls and floors were wet, and the air was heavy and cold, like a flooded basement in a home. In fact, Dixon Bogert, deputy project manager for the Main Injector, said that it has rained in the unfinished tunnel due to moisture condensation. Dust was also prevalent from the ongoing cement work.

The rest of the Main Injector, however, is relatively dry, painted and dust-free. Some magnets are even sitting in the more finished part of the tunnel, and project managers did not want them to get dusty from the last bit of cement work, so they erected the walls.

With the walls down, the air can circulate, and strategically placed dehumidifiers dry the air. When the concrete dries sufficiently in the last section, workers will paint it and start installing the electrical conduit.

Although pass-through is a symbolic milestone in the project, Bogert said he prefers to celebrate the practical aspect of the event.

“This is useful because we can now...distribute [equipment] going the short way around instead of the long way,” said Bogert. ■

## STOCKROOMS TO CLOSE FOR INVENTORY

The Fermilab stockrooms will close for annual inventory as follows: Wilson Hall stockroom, closed Friday, May 17, at noon, will re-open Monday, May 20 at 12:30 p.m.; Site 38 stockroom, closed Monday, May 20, and Tuesday, May 21, all day both days. Please plan accordingly. Questions? Call the supply office at x3808.

## NALWO POTLUCK SUPPER

The NALWO potluck supper on Friday, May 17, from 5:30 p.m. until 8 p.m. at the Village barn, will have the added attraction of dances performed by the Fermilab Scottish Country Dancers. Please come with your family; bring a dish to share or contribute \$3 per adult. Enjoy the company, cuisine, and conversation of lab employees, visitors, and guests from around the world! Call Selitha Raja, (708) 305-7769.

## CALLING ALL ARTISTS

The Fermilab Arts & Crafts Show is calling for artwork from current Fermilab employees, visiting scientists or graduate students, retired employees, contractors and members of their immediate families. Entry deadline is May 24. Participating artists must bring their work, ready for placement, to the 2nd floor gallery before 10 a.m., June 3. Artwork must be picked up from the gallery on July 1 between 10 a.m. and 4 p.m. Information and entry forms are available at the front atrium desk. Mail entry forms to MS 105.

## SUMMER VOLLEYBALL LEAGUE

Fermilab summer volleyball league begins May 20. Games at the Village sand volleyball courts on Mondays and Tuesdays. Contact Maxine Snee, maxine@fnal.gov or x8014.

## SUMMER TENNIS LEAGUE

Fermilab summer tennis league begins May 20. Round robin tournament format with games played weekdays. Playing times will vary. All level players are welcome. Deadline to sign up for this round is May 17. Contact Luc Demortier, luc@fnal.gov

## SUMMER BASKETBALL LEAGUE

Fermilab summer basketball league begins June 20. Games at the gymnasium, Thursday, 5:30 p.m. Captains meeting, May 29, at noon in the Wilson Hall Atrium. Rosters are due at this time. For more information Contact Denise Bumar, denise@fnal.gov or the Recreation Office, X2548, Jeanm@fnal.gov. Must be a current facility member.

## POOL MEMBERSHIPS

1996 Fermilab swimming pool memberships are on sale in the Recreation Office, WH15W. Membership is open to employees, visiting researchers, eligible contract personnel and their immediate families. Rates are \$30 for singles, \$60 for families up to four, and \$5 for each additional family member. The pool will open May 25 at noon. See the Recreation Office for pool hours.

## CHILDREN'S SWIMMING LESSONS

Fermilab offers children's swim lessons Monday, Wednesday, Friday. Beginners 10:45-11:30 a.m. Intermediate 10-10:45 a.m. Beginners must be 42" tall or five years old. Session I, June 10-July 12; Session II, July 15-August 16. Applications in the Recreation Office, WH15W. First come, first served.

## CLASSIFIEDS

### FOR SALE

- Roller blades, ladies' size 8, including small-size wrist guards. Hardly used. \$60. Contact x5417, marcia@hep.net.
- 1992 Toyota Previa LE minivan. Two-zone a/c & heat, tinted glass, AM/FM/CD/cassette, pwr. windows/locks, ABS, 7 passenger, removable, folding, reclining benches, front captains' chairs, all cloth. Ex. cond. 44K miles. \$14,900. Call Don x4727/4616, donpoll@mds.fnal.gov, or Pat, x4028 or (708) 393-1527.
- Mac Classic, 4 Mb RAM, 40 Mb HD, keyboard and cables. A nice beginner machine. \$250. Call John x2529 or (708) 377-9552.
- 1975 Nomad trailer camper. \$2800 obo. Newly remodeled. Call Jim or Mac (708) 377-5006.
- Electric stove with microwave, \$100. Sectional couch with built-in recliner, \$400. Recliner chair, \$150. Roll-up wood desk, \$200. All in good shape. Call Greg, x3011.
- 1990 Honda Civic hatchback, 2 doors, 4 speed, 59K miles, \$4,600. Send mail to FNALD0::CARVALHO. To see the car, call Andre Sznajder at x8343 or x4914.
- 1988 Toyota Corolla, automatic, a/c, pwr. steering/brakes, PB, AM/FM/cassette, ex. cond., 79K miles, \$3800. Call MJ, x4501 or (708) 983-7452.
- Macintosh LCII (4 Mb RAM, 40 Mb HD), mono. monitor, keyboard, mouse. Includes/original documentation: Word, Excel, Quicken, Freehand, MacWrite II, and Wordtris. Great second home computer! \$275 obo. Call Jay, x8612, dittmann@fnal.gov.
- 2 bedrooms/2 bathrooms to share with a Fermilab postdoc. Available June 1. About 15 minutes from Fermilab in Naperville. \$390 per month. Call (708) 357-3526.
- 1991 Honda Civic, hatchback, 4 speed, blue, \$5,100. 1991 Ford Escort, hatchback, 4 door, 5 speeds, a/c, pwr. steering, AM/FM, blue, \$5,100. Both in ex. cond. Call Sergio (708) 898-4631.
- Tappan 30" electric stove self-cleaning, almond color, used 1 year, like new, \$75. Pied Cockatiel, 5-year-old male (talks some) includes large cage and accessories, \$100. Call Jean x2548.
- Macintosh Performa 46068030 processor running at 33MHz, 8Mb RAM; Processor Direct Slot (PDS); keyboard; mouse; microphone; 14" color monitor; system 7.5.1, ClarisWorks, external quad speed CD ROM drive w/Groliers Encyclopedia & Mayo Clinic, \$900 obo; Call Bill Noe, x4553, page 0225 or (708) 892-9763.
- Channel Master Ultra-Hi UHF/VHF-FM tv antenna. Designed for fringe area reception; 10', 2 months old, never unfolded or used. Comes in box with instructions and hardware. \$80 value, \$60. Call Rob at x3401 or (708) 513-9422 or atkinson@fnlib.fnal.gov

## MILESTONES

### Retired

Douglas Porch, on May 3, 1996. He started at Fermilab on January 28, 1980. Porch worked for the Technical Support Section's Material Control Group, as a technician.

### LETTER TO THE EDITOR

I would like to take this opportunity to say a big "THANK YOU" to Roads & Grounds and NALREC committee for another great Arbor Day! I know a lot of work and planning goes into events like these and I, as well as many others, appreciate their efforts for Arbor Day and all year long. Thanks again.

Ruth Salach  
Department of Energy  
Fermi Group

## Invitation

### LAB WIDE CELEBRATION

*I invite all employees, users,  
DOE and contractors to a  
Labwide party to celebrate the  
successful completion of  
Collider Run I and the start of  
the next fixed target run.*

*~ John Peoples*

Date:

*May 17, 1996*

Location:

*Wilson Hall Atrium*

Time:

*3:30 p.m. to 6:30 p.m.*

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Fermi National Accelerator Laboratory

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