

F E R M I N E W S

F E R M I L A B

A U.S. DEPARTMENT OF ENERGY LABORATORY



User Demographics 2

Photo by Fred Ullrich

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Check in at Fermilab



Photo by Fred Ullrich

Cover photo: The MINOS collaboration includes 180 scientists, some of them shown here in front of their prototype detector. It is one of several large international collaborations of scientists that use Fermilab for physics experiments.

USER Demographics

by Judy Jackson

Alabama sends three; Poland four. Two hundred and thirty four come from Italy, 63 from Pennsylvania and 150 from California. There's one apiece from Ecuador, Slovakia and Turkey. Russia and New York are about equal, with 185 and 171, respectively.

As Run II begins in the spring of 2001, Fermilab's users come to Batavia from universities and laboratories the world over to work on experiments at the energy frontier. Of the total number of 2,528 users, 1,579 come from 100 institutions in 34 states. The remaining 949 are from 104 foreign institutions in 26 countries. Interestingly, however, the number of foreign nationals—1,368—among Fermilab experimenters exceeds the number of U.S. collaborators at the laboratory, since many U.S. university physics departments and labs include non-U.S. physicists. At 557, the number of graduate students makes up about 22 percent of the total user community.

Not surprisingly, the collider detector experiments have the largest collaborations, with 599 experimenters from 69 universities and labs at DZero, and 578 from 54 institutions at CDF.

Coming:
Fermilab Users' Meeting,
June 11-12, 2001.



What brought YOU to Fermilab?



DANIELE PEDRINI,
ISTITUTO NAZIONALE DI FISICA
NUCLEARE, BTeV, WITH DAILY LOG BOOK

I came for the physics. I arrived in 1984, one of the first Italians to come to Fermilab, and I have been here ever since, working on the physics of heavy mesons.

When you do this kind of work, you do it for yourself. Something happens inside you—call it the holy fire of physics, the need to know how the universe works. It's been that way for me since I was six or seven years old. I really could not do anything else but satisfy my curiosity to understand how Mother Nature works.



MATT HERNDON,
THE JOHNS HOPKINS
UNIVERSITY, CDF,
WITH A MODEL A150
SILICON POWER
SUPPLY

There are not too many places in the world where you can do particle physics. I've already worked at SLAC and CERN. There is exciting physics at Fermilab right now.

I've lived in Europe for a few years, and I was ready to come home for awhile. I've worked with electron-positron collisions. Now I'm ready to give hadrons a try.

The next ten to fifteen years are mapped out, and the accelerators are being built. From the physics viewpoint, we have some idea what we might find. When we get to the next generation of experiments, we will either learn that discoveries that integrate our understanding of physics are right around the corner, or we will learn that these discoveries are many orders of magnitude farther away. I'm working on the CDF supersymmetry group, and I think there is a fair chance that we will see signs of something.

What are your best HOPES and DREAMS
for PARTICLE PHYSICS and for your own research?



BASSAR SABIROV,
DUBNA, DZERO, WITH MINI-DRIFT TUBE

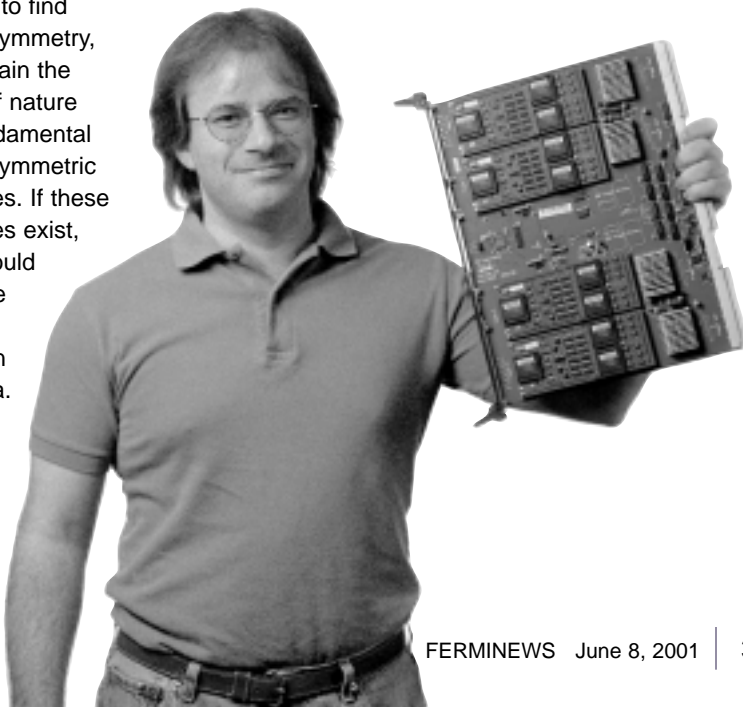
Only Fermilab is at the high-energy frontier. There is nowhere else. Our institute, the Joint Institute for Nuclear Research, supports us in doing experiments at the energy frontier.

My personal goal is to learn more about the top quark in Run II. I believe we will see a revolution in our understanding of particle structure.

LAURENT DUFLOT,
ORSAY, DZERO, WITH A CALORIMETER
BASELINE SUBTRACTION CARD

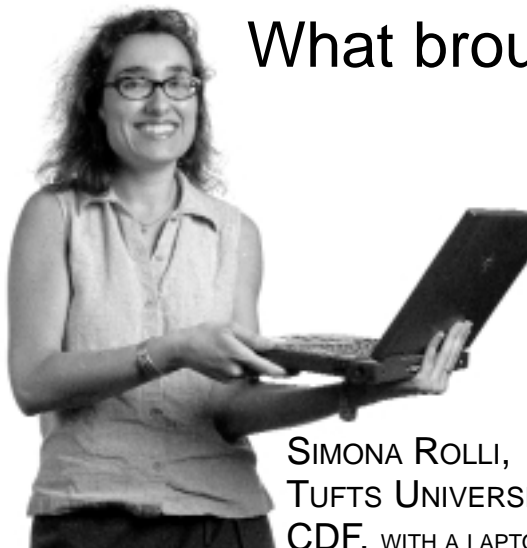
I want to look for new phenomena at the energy frontier. To look for supersymmetry, I need to stay at the highest-energy accelerator, and that is at Fermilab.

I hope to find supersymmetry, to explain the laws of nature by fundamental supersymmetric particles. If these particles exist, we should be able to see them in Run IIa.



Photos by Reidar Hahn

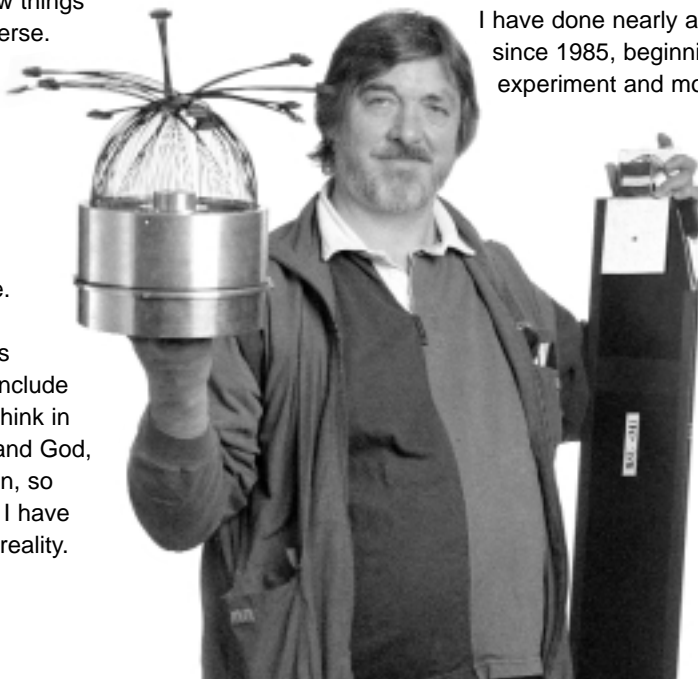
What brought YOU to Fermilab?



SIMONA ROLLI,
TUFTS UNIVERSITY,
CDF, WITH A LAPTOP

It's a long story how I got to CDF. I was studying for my Ph.D. in Pavia when I read a book, *"Lonely Hearts of the Cosmos."* It got me excited about cosmology. A professor suggested I go to Fermilab to learn more about it. Rocky Kolb invited me to come as a visitor for six months. So I came. My English was terrible. I barely understood twenty percent of what I heard. Eventually, I needed to finish my thesis on quantum chromodynamics theory, so I moved to the Fermilab theory group. In 1995, my university, Pavia, joined CDF, and so did I. I had to learn to be an experimenter. In 1997, I got a job at Tufts. I'm still interested in cosmology, but I have no time to think about it. I'm the convenor of the exotics group at CDF.

I always wanted to be a scientist; I just wasn't sure what kind. Now, it seems to me that my dream is happening exactly the way I hoped. As particle physicists, we are the equivalent of the natural philosophers, trying to find how things are made, to discover new things about the universe. As particle physics goes to higher and higher energy, we get closer and closer to the beginning of the universe. Somehow, our particle physics theory has to include gravity. I also think in terms of faith and God, but I am human, so I use the tools I have to understand reality.



ANDREW BAZARKO,
PRINCETON UNIVERSITY,
MINIBOONE, WITH PHOTOTUBE

Fermilab is THE national accelerator laboratory. Particle physics has very few Meccas. To get an experiment done, you need the particle beams and technical support that Fermilab can offer.

The questions we are trying to answer are very interesting. In the next few years, we will understand mass a lot better—both for neutrinos and the Higgs, whether that's the right mechanism. In the years ahead, we are bound to find surprises. The things we learn play a role in other aspects of physics. They inform cosmology and our understanding of the universe. We may find particles that tell us about dark matter. It's sort of amazing that human beings can ponder these things at all.



GIOVANNI PAULETTA,
UNIVERSITY OF UDINE, CDF,
WITH A SCINTILLATION COUNTER (LEFT) AND
A LASER-BASED STABILITY MONITOR

I have done nearly all my research at Fermilab since 1985, beginning with a fixed-target experiment and moving to CDF.

Physics gives us the opportunity to think about how nature works. I like spending time on doing things, getting to the bottom of nature. We have a global picture in mind, but we go back to work on our little piece of the puzzle. The big picture is too big for any one person. It's a privilege to be able to participate in this effort.

What are your best **HOPES** and **DREAMS** for **PARTICLE PHYSICS** and for your own research?

GIORGIO CHIARELLI,
UNIVERSITY OF PISA, CDF,

WITH SILICON LAYER MODULE

I first came to Fermilab in 1983, as a student. It happened by chance. Someone at Pisa suggested that I fill out a form to participate in a summer program at Fermilab. I did, and I was selected. I went to work on CDF at about the time they were breaking ground at BZero. When I went back to Pisa, I did my thesis on secondary vertices to detect the top quark. After I served in the army, I returned to join the top effort at CDF. In a recent speech to young students, I talked about the experience of the top discovery. We were very

privileged. Not many people have such an opportunity. I think all of us who were together for that experience feel a bond.

Now we want the Higgs, the missing piece. I believe it will be found in the next few years, either at Fermilab or at CERN.

It really doesn't matter. We are moving toward a cross-fertilization with astrophysics. That interests me both because of the common techniques that we can use, and because it is a completely new world, a different philosophical approach. 🍷

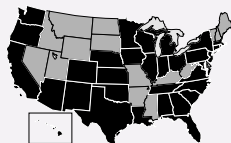


Photos by Reidar Hahn

FERMILAB USERS BY THE NUMBERS

DOMESTIC

100 Institutions, 34 States



Top 10

(Other than Fermilab, 308)

University of Rochester	57
Lawrence Berkeley National Laboratory	56
University of Michigan, Ann Arbor	49
Harvard University	36
University of Illinois, Urbana-Champaign	33
University of Pennsylvania	33
Michigan State University	32
University of Chicago	31
Argonne National Laboratory	30
Purdue University	29

By State:

Alabama 3; Arizona 21; California 150; Colorado 9; Connecticut 15; Florida 32; Georgia 2; Hawaii 7; Illinois 467; Indiana 74; Iowa 20; Kansas 14; Louisiana 10; Maryland 27; Massachusetts 101; Michigan 84; Minnesota 28; Nebraska 3; New Jersey 25; New Mexico 41; New York 171; North Carolina 23; Ohio 13; Oklahoma 10; Oregon 4; Pennsylvania 63; Puerto Rico 9; Rhode Island 19; South Carolina 5; Tennessee 15; Texas 68; Virginia 18; Washington 11; Wisconsin 17.

INTERNATIONAL

104 Institutions, 25 Countries



Top 11

IHEP, Protvino, Russia	62
University of Pisa, Italy	60
JINR, Dubna, Russia	42
University of Tsukuba, Japan	39
ITEP, Moscow, Russia	33
CDPF Brazil,	27
University of Pavia, Italy	26
University of Padova, Italy	24
CEA-Saclay, France	23
PNPI, St. Petersburg, Russia	22
INFN Frascati, Italy	22

By Country:

Argentina 6; Brazil 40; Canada 19; Colombia 11; Czech Republic 6; Ecuador 1; France 53; Germany 24; Greece 4; India 24; Israel 4; Italy 234; Japan 109; Mexico 20; Peoples Republic of China 38; Poland 4; Russia 185; Slovakia 1; South Korea 27; Spain 8; Sweden 13; Switzerland 12; Taiwan 20; The Netherlands 8; Turkey 1; United Kingdom 77.

Total from U.S. Institutions: 1,579

Total from International Institutions: 949

Total Foreign Nationals: 1,368

Total Experimenters: 2,528

NuMI Project

by Kurt Riesselmann

Fermilab managers responded to recommendations of an expert NuMI review panel convened last month with determination to put the project on track for successful completion.

"We clearly have work to do," said NuMI Project Manager Dixon Bogert, "and we will do it."

Faced with increased project costs and delayed schedules, Fermilab managers and collaborators of the Neutrinos at the Main Injector, or NuMI, project and the related Main Injector Neutrino Oscillation Search experiment, hosted a high-level review chaired by the Department of Energy's Dan Lehman, with the aim of "re-baselining," or redefining, the project's cost and schedule. On May 22, the Lehman committee of experts in underground construction, engineering, procurement and project management met at Fermilab to review all aspects of the NuMI project.

At a close-out session on May 24, the panel reported that, while NuMI had made good progress in nearly all areas, significant challenges remain. They recommended changes to address the challenges and asked the NuMI project management to schedule a follow-up review in August before requesting increased project funding and setting a revised schedule.

"The project management has done a great job of identifying problems of the NuMI project," Lehman said, "but we are not ready to accept the changes yet."

Lehman and his team had listened to presentations, studied budgets and reviewed timetables to scrutinize NuMI's progress. The project includes the design and construction of the new NuMI beamline at Fermilab, which will produce neutrinos, and the MINOS experiment, whose two detectors will examine the neutrinos in an underground hall at Fermilab (near detector) and in a former iron mine in Soudan, Minnesota (far detector). Physicists expect the neutrino beam to change its composition during the 450-mile flight through the earth, proving the existence of neutrino oscillations.

"MINOS will have much better statistics than present experiments," said Boris Kayser, a theoretical physicist of the National Science Foundation, in a recent interview. "Physicists would really like to see a wiggle of the oscillations. MINOS is in a good position. It has the possibility of studying neutrino oscillations as a function of energy. It will provide the gold-plated confirmation."

DELAY AND COST INCREASE

Lehman, director of DOE's Construction Management Support Division, has conducted hundreds of DOE project reviews. "We have known about cost growth of the NuMI project since our last review in November 2000," he said. "Now we are asking: Can we validate the cost-increase and schedule estimates?"



Business lunch at Fermilab: The Lehman committee members used every minute for discussions with the NuMI management and among themselves.

In November, the Lehman committee heard a proposal by the NuMI management to re-baseline the project by adding adequate contingency funds and establishing a new schedule for project completion. The November panel asked the NuMI management to take a closer look at costs associated with the technical components of the NuMI beamline. Fermilab responded by assigning additional managers and engineers to review the work still to be done.

At the start of last month's review, Dixon Bogert, NuMI project manager, presented the results of the studies and gave more precise numbers for the re-baseline proposal.

"Including adequate contingency funds, the expected deficit is 28.4 million dollars," Bogert told the Lehman committee. "We estimate the new total cost of the project to be 167.8 million dollars, about a 20 percent increase."

The framework of the new project schedule greatly depends on the underground excavation currently under way.

"Based on the progress made so far, we expect a finishing date for the NuMI excavation after April 2002, possibly as late as September," said Bogert. "We expect the end date of the complete NuMI project to shift as a result. Our next review in August will determine the new schedule."

The safety record of the underground construction was another focus of the review.

"We put a lot of pressure on the contractor to improve safety training and procedures," said Fermilab Director Mike Witherell.

Although the project has not had a lost-time accident since March, the total number of accidents during the tunneling effort concerned review panel members and Fermilab managers alike, and the Lehman committee recommended a further strengthening of safety measures.

"There is no aspect of the NuMI project more important than safety underground," said Witherell. "We are taking additional steps to bring the level of safety in the tunneling effort up to the standard we expect in every aspect of laboratory and subcontractor operations."

ENGINEERING RESOURCES ADDED

In recent years, Fermilab made Collider Run II with its great discovery potential the laboratory's highest priority, leaving few resources for other projects. The completion of the new Main Injector in 1999—built on time and on budget—failed to free many resources for the NuMI project, because of the continuing number of Run II-related tasks and other projects. The punctual start of Run II in March finally allowed Fermilab to assign additional manpower and expertise to the NuMI project.

NuMI Project

"The project has been hampered by the lack of engineering resources," said Bruce Baller, who joined the NuMI management team in February. "Recently, however, the NuMI project has seen a dramatic increase in engineering. It has resulted in obtaining better cost estimates for parts previously not looked at in much detail."

The detailed engineering analysis of the new beamline and its technical components revealed unexpected costs that account for a large fraction of the total cost increase.

"The engineering of the technical components is not as advanced as we would like it to be," said Ron Lutha, the local DOE project manager. "We need to make sure we will not have further cost increases. What does it take to do that? People, in essence. The laboratory has been making steps in this direction."

The Lehman review team, concerned that a few more months of engineering might uncover additional costs, scheduled the additional review in August to give engineers and managers an extra two months to verify budgets.

"The NuMI project is a technical and managerial challenge," confirmed Lehman. "With all the other projects going on at the lab—Run II, CDF and DZero upgrades, contributions to LHC—this project has suffered."

GOOD NEWS FROM "UP NORTH"

Project manager Bogert also had good news to report to the Lehman committee. Work at the northern end of the NuMI project, in Soudan, Minnesota, is progressing well.

"Outfitting of the underground halls for the far detector started in December 2000," Bogert told the committee. "The Lakehead Company has maintained its schedule, and contract completion is scheduled for July 19, 2001. Steel for the far detector has been ordered, and the first steel will be delivered soon."

A newly excavated cavern, MINOS Hall, will house the 6,000-ton detector, which consists of almost 500 octagonal planes of steel, separated by layers of plastic scintillator.

"We have 5,000 tons of steel and another 1,000 tons of scintillator to deal with," said Earl Peterson, director of the Soudan Underground Laboratory. "To move those around efficiently and – even more so – safely we rely on eight crane systems. Seven have been installed so far."

To bring all this material into the mine, the MINOS collaboration uses a half-mile-deep access shaft, requiring many trips to lower detector components. Bill Miller, lab manager at Soudan, enthusiastically described progress so far.

"Things are really coming together beautifully," he said. "All steel handling will be in place next week, and soon all electrical systems will be done. In July, we can start building the detector, which will take about two and a half years. Manpower is probably the biggest roadblock we're facing. Right now, we have a mine crew of 16 people. We want to have 35 people by the end of August."

DETECTORS ARE ON TRACK

The panel found that the costs of the two MINOS detectors, part of the total NuMI project cost, are well under control. In fact, Aesook Byon-Wagner, MINOS project manager, is optimistic that the construction of the detectors will be well within budget and on schedule.

"There is a chance that not all of the contingency funding for the near and far detectors will be used," she told the Lehman committee.

Byon-Wagner gave an outlook on the installation of the far detector.

"The limited access to the Soudan Underground Laboratory calls for careful planning," said Byon-Wagner. "Last year, we established a detector project plan that has more than 200 trackable milestones. We have already met about 50 of them."



Photo by Jerry Meier, Soudan Underground Laboratory

The installation of infrastructure in the MINOS Hall at the Soudan Underground Laboratory progresses as planned. In August, scientists will begin the assembly of the MINOS detector, which will take more than two years to complete.

Seventeen different institutions are building parts of the detectors. The MINOS collaboration is content with the progress and is looking for ways in which its international team of 180 physicists and engineers can help out with non-detector problems. The collaboration has already begun extensive efforts in the beam design work.

"The detector effort is in good shape today," said Stan Wojcicki of Stanford University, spokesperson of the collaboration. "We can shift resources toward participation in beam area activities."

CRUCIAL TWO MONTHS AHEAD

The Lehman committee affirmed that the NuMI project will provide important new experimental capabilities for the national high-energy physics research program. To move NuMI forward, the panel wants to establish the new project baseline by Fall of this year, requesting extra congressional funding for fiscal year 2003. To meet this goal will require a strenuous two-month effort from Fermilab.

"The project needs to increase pace and validate the cost estimates," said Roy Cutler of Oak Ridge National Laboratory, member of the review committee. "There still are large uncertainties in the costs of several of the NuMI technical components."

The panel also emphasized the need for improvements in procurement, safety and contract management. Laboratory management is responding by assigning more personnel and making organizational changes.

"We will fix the administrative aspects—safety, procurement and construction management—to give NuMI the best possible support as it addresses remaining technical difficulties," said Associate Director Bruce Chrisman.

Witherell noted the particular challenges that underground construction presents to both the contractor and the laboratory.



Photo by Reidar Hahn

Fermilab engineer Chris Laughton (left) explains the NuMI excavation to Dougal McCreath of Laurentian University, a member of the recent Lehman review panel.

"It is clear that we will have to devote increased attention to meeting these challenges," he said.

The Lehman committee asked Fermilab management to provide a refined cost estimate and schedule to DOE by July 31. On August 21-23, a subcommittee will conduct a focused DOE review of those results, with the aim of recommending a new baseline.

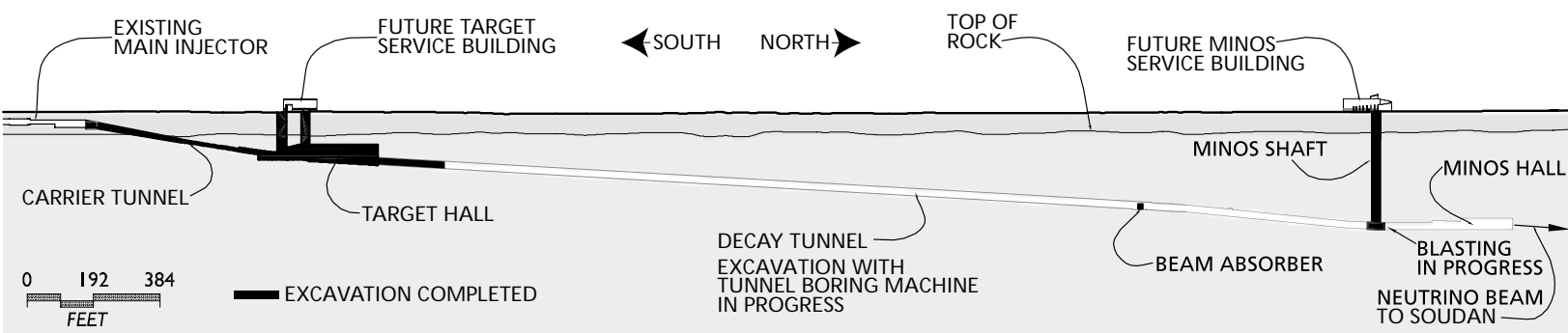
"NuMI/MINOS is an important component of the Fermilab scientific program for years to come," Witherell said. "We will do what it takes to successfully build and operate this unique facility for studying the physics of neutrinos. 🇺🇸"

On the Web:

MINOS experiment and NuMI beamline:
www-numi.fnal.gov:8875

Soudan Underground Laboratory:
www.soudan.umn.edu

Time-lapse movie of the Soudan Hall outfitting:
www.soudan.umn.edu/Albums/MINOS/Weekly_Photos/



The NuMI excavation has made progress, but is about five months behind schedule. Preparation of the target hall took longer than expected and delayed the assembly of the tunnel boring machine, which has excavated about 200 feet so far.

Chez Léon

THE PEOPLE'S CHOICE



The Chez Léon kitchen crew has a tight-knit loyalty that comes from years of working together. From left, Tita Jensen, Chivas Makaroplos, Cathy Lootens, Mirna Rojas, Flora Shockley and Konnie Barnes. Not pictured: Emily Alcorn.

"People ask me: Why do you write about food, and eating and drinking? Why don't you write about the struggle for power and security, and about love, the way others do?"

"The easiest answer is to say that, like most other humans I am hungry. But there is more to it than that... There is a communion of more than our bodies when bread is broken and wine drunk. And that is my answer, when people ask me: Why do you write about hunger, and not wars or love?"

M.F.K. Fisher

by Judy Jackson

Even at a physics lab, people get hungry. When they do, Chez Léon is there to feed them. For 22 years, the onsite restaurant named for Fermilab's second director, Nobel laureate Leon Lederman, has been feeding everyone from visiting VIPs to workmen on their lunch breaks at its dining room in the Fermilab Village. In the process, chef Tita Jensen has created not only a tradition of distinctive cuisine but also a sense of community.

"This is not an executive dining room," Jensen said recently. "Everyone from the lab is welcome at Chez Léon, from the most famous scientist to the newest employee. I think the award lunches open it up. People come here for a lunch in honor of their length of service at the lab, and they see that everyone gets treated the same. They come back and bring their friends. I hate food snobs."

Indeed, Jensen's almost maternal care for her Chez Léon diners is legendary. She frets when customers fail to clean their plates and responds happily to special requests. It's a rare Wednesday that fails to find her emerging from the kitchen with at least one lighted birthday cake, leading the lunch crowd in what may be the world's slowest rendition of Happy Birthday. Jensen's family feeling for Chez Léon regulars extends even to a couple who, she says, invariably find fault with the meal or the service.

"It's always something," Jensen said ruefully. "The glass has a spot, or there's a problem with the food. But they keep coming back."

On June 1, meal prices at Chez Léon rose to \$10 for Wednesday lunch, \$23 for Thursday dinner.

The community feeling at Chez Léon begins in the kitchen with a tight-knit crew of women, some of whom have worked with Jensen since they were teenagers.

"I have the best staff," Jensen said. "Chez Léon would not be here without them."

A recent Wednesday found the kitchen crew making last-minute preparations for a lunch of sliced flank steak with honey-chipotle glaze, jicama slaw, seasoned rice and orange-cardamom flan with sliced strawberries. The first few diners began arriving at 11:30.

Reassuringly to a non-professional observer, although lunch service came seamlessly together, it wasn't exactly clockwork in the kitchen.

"Where are these going?" Jensen asked an assistant who was rapidly filling plates with salad and strips of beef. "There's nobody out there yet. Put this rice back in the oven please."

By 11:45, the dining room had begun to fill up, and plates began to fly out the kitchen door.

"How many individual flans did we make?" Jensen asked.

"Sixteen."

"Let's get the strawberries going."

An assistant chef mixed a large stainless-steel vat of strawberries with sugar. Another washed a bunch of mint she had just picked from the herb garden by the kitchen door. A sprig would garnish each plate of strawberries and flan.

At 12:30, with lunch well under way, a dozen unexpected guests arrived, their lunch reservations having mysteriously vanished. Although the dining room was already crowded, in five minutes Jensen had set up another table and started the newcomers on their meal. With the new arrivals settled, she disappeared into the pantry, emerging with a blazing birthday cake.

"Ha-a-a-a-pp-eee Birrrrrthd-a-a-a-ay toooo youuuu....."

As lunch service ended and the pace in the kitchen slowed, Jensen sat briefly at the kitchen table to talk to a visitor.

"We are busy," she said. "At Wednesday lunch, we could easily serve a hundred, if we could accommodate them. The dining room was originally supposed to seat thirty, but we routinely seat sixty. Today we served eighty lunches. We put extra seating on the patio to take care of the lunchtime overflow."

How does she plan menus?



Photos by Reidar Hahn

Dominican-born chef Tita Jensen makes monkfish flambéed with cognac and cooked in white wine with garlic and herbs.

"I work with the menus myself," Jensen said. "I read books. My mother sends me recipes, people bring me menus when they travel. I like to serve Dominican food, because that's where I'm from, and it's the food I grew up with. I've found that people at Fermilab will try anything. That's the joy of this job. I think I would be bored stiff in a regular restaurant."

An annual operating subsidy from Fermilab contractor URA keeps meal prices affordable. For that reason, Jensen said, Chez Léon serves only members of the Fermilab community and their guests. Besides weekly Wednesday lunch and Thursday dinner, a burgeoning schedule of catered meals for laboratory events keeps the kitchen busy.

"This was a typical week," Jensen said. "We did the Technical Division Review dinner on Monday, lunch for 50 minority students Tuesday at noon and dinner for NuMI reviewers on Tuesday night. People like it, and it is affordable. They can eat good food together in a private dining room. No one throws them out at the end of the meal. They can sit there and talk all night if they want to."

The food is the medium, but for Jensen the message is the community it brings.

"People like it here," she said. "My biggest success is that everybody feels comfortable at Chez Léon." 🌟

Prague scienti



This castle, high above the city, is Prague's landmark.



by Chad Boutin

The particles could travel, but the particle physicists couldn't.

Czech physicists now form a lively group at Fermilab's DZero. But for many Cold War decades, scientists in Prague were isolated from their Western colleagues.

"Fermilab was like Jupiter for us," said Ivan Wilhelm, Charles University rector and himself a nuclear physicist. "We knew it existed, but we couldn't reach it."



King Charles IV, founder of Charles University in Prague.

Researchers from three Prague institutions—Charles University, Czech Technical University, and the Academy of Sciences of the Czech Republic—are now fully engaged with the community at DZero, contributing to the experiment and to the education of future scientists.

"The Prague group has been right up to speed with us from the outset," said John Womersley, spokesman for DZero. "It's as though there had never been a barrier between us at all."

BUILDING A COLLABORATION

Once the Iron Curtain was torn down, senior physicist Vladimir Simak of the Academy of Sciences saw places like Fermilab as international destinations and sources of international collaboration, instead of as interplanetary dreams. Simak made contact with a number of Western colleagues at a 1996 workshop in Padua, Italy, which led to his collaboration on experiments at CERN, the European Laboratory for Particle Physics. It was in Geneva that he first heard about the planned upgrades to Fermilab's Tevatron. For a physicist with longstanding interest in probing the structure of the proton, the possibility of contributing to Collider Run II was a great temptation.

"Our forays in antiproton physics began many years ago, in the 1960s," Simak said. "After our work was completed at Dubna, Serpukhov, and CERN, we wanted to continue our studies at Fermilab."

While the proton's basic substructure is known, researchers would like a better picture of how its three quarks (up-up-down) and multiple gluon pairs interact. The Prague group's expertise in antiproton physics made them good candidates to help build the muon, silicon and forward proton detectors at DZero.

"When protons and antiprotons collide head-on, the high energy produces a shower of new particles flying off in all directions," Womersley explained. "But when they merely strike glancing blows off each other, nothing new is produced—they just fragment into their constituent particles, which continue to move more or less along the beamline, like buckshot out of a gunbarrel."

Beside the proton detector, the Prague group has contributed to other pieces of the DZero detector.

sts check in at Fermilab

"The Czechs are excellent collaborators," Womersley said. "A huge experiment like DZero is like a small town—the butcher and the baker have to contribute to the overall welfare if the community is to thrive. The Prague group has paid its taxes by assisting with the muon and silicon detectors."

These two detectors, which respectively form the outermost and innermost layers of the DZero assembly, proved both technically and financially challenging to construct. Because the muon detector required a formidable number of parts, one problem was manufacturing the components at a reasonable cost. The Czech group's ingenuity helped solve it.

"I remember visiting their facilities in Prague," Womersley recalled. "They had taken over an old bus garage to build detector parts. They are good at using what's available to get the job done."

Although computer facilities in the Czech Republic are similarly limited, the group has made efficient use of them as well.

"The two Linux farms in Prague and Brno are a small portion of the computing resources that DZero needs," Womersley said, "but the Czechs have used them to test the software we use to reconstruct particle collisions. They have also contributed millions of lines of programming."

Put it all together and it's a lot for 10 physicists and graduate students to handle. But it is this overlap of commitments that gives the group members a global perspective on DZero.

"What impresses me about the group is their involvement in all aspects of the experiment," Womersley said. "They have provided technical manpower for assembly, and their physicists have tested the gear. They have done great work."

TRAINING FOR THE FUTURE

Such eclectic responsibilities provide an excellent training ground for young physicists. Two graduate students from Prague, Sasa Kupco and Karel Soustruznik, have spent years at Fermilab helping to prepare for Run II.

"I have been here since 1997," Soustruznik said, "and Sasa since 1999. Since then, we have been helping assemble the central muon detector, but we have to devote some of our time to writing software for the Linux farm as well. And then there's our dissertations. It all keeps us busy."



Sasa Kupco (left) and Karel Soustruznik are graduate students from Prague. They worked on the central muon detector of the DZero experiment.

Photo by Reidar Hahn

Prague



The Charles University in Prague is the oldest university in central Europe, founded in 1348. These rather modern buildings host the Faculty of Mathematics and Physics.

Soustruznik is analyzing top quark data collected from Run I, while Kupco will use Run II data to investigate proton structure. But it is their exposure to all aspects of detector management that will most benefit their future in high-energy physics. Ivan Wilhelm has also brought this philosophy to his own classrooms over the years.

"It is important to give opportunities to young people," Wilhelm said. "It is necessary to have a theoretical background, but then you must apply it to experiments. When it is possible to show students every aspect of how a detector works, it builds continuity with the future. They will know how to manage a big experiment of their own someday."

With this outlook, the Prague scientists have forged alliances at DZero and with the international scientific establishment, which recognizes their prowess.

"Thanks to funding from the NSF and Michigan State University as well as the Grant Agency of the



Photo by Jenny Mullins

Some of the Czech physicists working on experiments at Fermilab: Vladimir Simak, Karel Soustruznik, Milos Lokajicek, Stanislav Nemecek, Václav Vrba and Sasa Kupco.

Czech Republic, our work here got off to a good start," Simak said. "We are also receiving funds from the newly created Center for Particle Physics in Prague."

Funding is an especially tricky issue in Central Europe, where national economies remain in transition. But having arrived at Fermilab, the Prague group is planning an extended stay.

"The experiments at CDF and DZero are challenging ideas and theories in high-energy physics," Simak said. "It is exciting and we are glad to be a part of it." ☼

On the Web:

Faculty of Mathematics and Physics at Charles University: www.mff.cuni.cz/eng/

Czech Technical University at Prague: www.cvut.cz

Elementary particle physics at the Academy of Sciences: www-hep.fzu.cz

Center for Particle Physics: www-hep.fzu.cz/Centrum/eng/

Information on Prague: www.a-zprague.cz and www.prague.com



Photo courtesy Arnold Pompos

Ivan Wilhelm, physicist and Charles University rector.

CALENDAR

Fermilab Art Series Presents:

Max Morath – The Ragtime Man

June 16, 2001, 8 p.m., Ramsey Auditorium.
Tickets: \$12 (\$6 ages 18 and under).

Max Morath returns to present a musical glance at an earlier America, blending humor, satire, and song with plenty of rocking ragtime piano solos along the way. Morath takes his audiences to the infant years of the 20th Century, when ragtime, Americas first Pop Music, bewitched the kids and scandalized their parents.

International Film Society Presents:

Being John Malkovich

June 8, 2001, 8 p.m., Ramsey Auditorium. Tickets: \$4. Dir: Spike Jonze, USA (1999), 112 min.

A puppeteer discovers a door in his office which turns out to be a portal into the mind of actor John Malkovich. Things become even more bizarre and humorous when the puppeteer decides to try to sell trips inside.

Gun Crazy

July 13, 2001, 8 p.m., Ramsey Auditorium. Tickets: \$4. Dir: J. H. Lewis, USA (1950) 86 min.

Bart Tare, a man with a love for guns from childhood, falls for what he thinks is the perfect woman. A Bonnie and Clyde type adventure film that has become a film noir classic.

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

ONGOING

NALWO

Free English classes in the Users' Center for FNAL guests, visitors 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.

FERMILAB ART GALLERY

Employee Arts and Crafts Show, until June 13, second floor crossover of Wilson Hall.

DANCING

International folk dancing, Thursdays, 7:30-10 p.m., Village Barn, newcomers always welcome. Scottish country dancing, Tuesdays, 7:30 - 10 p.m., Village Barn, newcomers always welcome. For information on either dancing group, call Mady, (630) 584-0825 or Doug, x8194, or email folkdance@fnal.gov.

The last dance of the Barn Dance season will be Sunday, June 10, 6:30-9:30 p.m. in the Fermilab Village Barn. Beginners and experienced dancers are welcome. The band Bloody Banjoists will play and Bill Sudcamp will be the caller. Adults: \$5; ages 12-18: \$2; under 12: free. For more information contact Dave Harding (x 2971, harding@fnal.gov) or Lynn Garren (x2061, garren@fnal.gov) or visit our webpage at www.fnal.gov/orgs/folkclub/. Dances will resume in the fall.

BRISTOL RENAISSANCE FAIRE

Kenosha, Wisconsin

Discover a day filled with revelry and merriment, the arts, enlightenment, and delightful family fun. Entertainment on 16 open air stages. Delectable treats from 50 food booths. Marketplace with over 180 high-quality arts and crafts shops. Faire runs June 30 through August 26. Discounted tickets (\$12.50/\$5.50) for sale in the Recreation Office, WH15W.



Help
Keep
Fermilab
Beautiful!

Join the Fermilab community in a special Third Thursday lunchtime clean-up.

Next date: June 21, 11:45 a.m. - 1:30 p.m.

Meeting point: east-side ground floor entrance of Wilson Hall.

Transportation, cleaning gear, refreshments and hot dogs will be provided.

MILESTONES

BORN



AWARDED

- Ph.D., to Eva Halkiadakis, Rutgers University (KTeV experiment)
- Ph.D., to Jonathan Link, University of California-Davis (FOCUS experiment)
- B.S.A., to Lavernzell Ruffin, Aurora University.

DIED

- Lynn Miller, Assistant Professor at James Madison University and member of the MINOS collaboration, on May 16.

LUNCH SERVED FROM

11:30 A.M. TO 1 P.M.

\$10/PERSON

DINNER SERVED AT 7 P.M.

\$23/PERSON



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, JUNE 13

Beef Tacos
Rice and Beans
Pico de Gallo
Coconut Cake

DINNER THURSDAY, JUNE 14

Marinated Roasted Vegetables with Feta
Grilled Swordfish
Tomato Rice
Green Beans with Onions and Dill
Peach Cake

LUNCH WEDNESDAY, JUNE 20

Cajun Shrimp Salad
Banana Bourbon Cake

DINNER THURSDAY, JUNE 21

Red Pepper Soup with Julienne of Zucchini
Pork Tenderloin with Lemon Ginger Sauce
Egg Noodles with Dill
Vegetable of the Season
Strawberry Napoleon

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The deadline for the Friday, June 29, 2001, issue is Tuesday, June 19, 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. Letters from readers are welcome. Please include your name and daytime phone number.

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CLASSIFIEDS

FOR SALE

- '92 Buick Regal, champagne/tan, very good condition, 114k, loaded. \$5,500 o.b.o. Call Ron at 630-859-0373.
- '91 Ford Mustang, 2-door hatchback. Good condition, 111k miles, very clean, runs good, must see. \$2,500 o.b.o. Call Glenn at x3725 or email smitty@fnal.gov
- '90 Oldsmobile Ciera SL Cruiser Wagon, blue, V6, automatic, cruise, AC, PS/PB, power windows/locks/seats, AM/FM cassette, third rear seat, 105k mi., very good condition. \$3,249. Call Rich at x3880 or 630-690-1691.
- '88 Chevy Cavalier, 140k miles, mechanically very reliable (has never not started in the winter), new muffler, significant rust. Good car for summer or short time stay at the lab. \$1,000 o.b.o. Ask for Don, x5218.
- '88 Dodge Daytona Turbo, red/charcoal grey interior, sunroof, A/C, auto, PS, PB, AM/FM cass., cruise, tilt wheel, PW, PDL, power mirrors, alloy wheels, black leather front-end cover. Well maintained, oil changed every 2,500 miles, extra clean, great condition. \$2,100 o.b.o. Call 847-286-8639 (daytime), 630-893-9433 (evenings).
- '88 Lincoln Towncar, V8, A/T, PS, PB, PW, PL, PM, PSeats, AM/FM cassette, 123,000 miles, white, with maroon leather interior, runs great, in good condition. \$2,000. Call x3875 or email dale@fnal.gov
- '88 Honda Accord DX Coupe, blue metallic, only 88k miles, 5-speed stick, original owner. Good condition. \$1,200. Email chertok@fnal.gov
- '86 VW Golf, 4 door, 5 speed. 32 mpg, clean interior, new tires. \$500. Call x4505 or email lambertz@fnal.gov
- '79 Dodge Van, 130k miles, good engine, needs brakes, \$800. Call x4390 or email michgall@fnal.gov Yakima rain gutter car top rack, 4 corner post with locks, 78" round cross bars. Great for carrying construction material. Accessories for bikes, skis and boats, excellent condition. \$200 new, sell for \$80. Call Stan at 630-985-7204.
- Berkline sofa and love seat. Both have 2 built-in recliners. Dark green with burgundy and tan stripes, \$800 for set. Call Ed at x2974 or 906-0752, email: eop@fnal.gov
- '88 Baja Sunsport Jetboat w/open bow. 350 Chevy Indmar 270 h.p. engine. Dominator jet drive, place diverter w/hydraulic option, 240 Hours, bilge pump, ski pylon, AM/FM stereo cassette, new battery, in red/black/white color. \$8,000. Contact Steve at x8879 or 630-554-5565.
- Thomas Trianon organ, very good condition. Make an offer. Call 6556 or email k.potter@fnal.gov
- Dog cage, suitable for large dog. 30"W x 48"D x 34"H. Slide-out plastic tray on bottom. Folds flat for transport. Excellent condition. \$40 o.b.o. Call 630-859-8596 or email pritchard@fnal.gov
- Reprints of "Bull", a watercolor of Fermilab's buffalo, Iris® Giclee® prints, limited edition of 100 each, full-size signed and numbered, original is now on display in the Employee's Art Show on the Mezzanine. Normal list price \$195, will make \$150 for duration of employee's show. Also available, small post-card sized prints approx. 5" x 7", \$5.00 each or 5 for \$20.00. "Bull" plus 5 other images available for both. Available soon, LE prints and post cards of "Sunning Cormorants", also on display. Contact Karl at karlw@fnal.gov, x3043 or 630-978-1166.

HOUSES FOR SALE

- Aurora Duplex. Listing price \$113,000. Great cul-de-sac location in the Georgetown neighborhood w/ brick patio to enjoy the park that backs the property. Impeccably maintained inside and out. 1.5 baths, l/r, 3 bedrooms, large eat-in kitchen with island. One car garage. Central air conditioning. Acclaimed Naperville District 204 schools. 20 minutes from Fermilab. Call 630-499-0244 or email cmohler@fnal.gov
- Bright, neat, clean and neutral 3 bedroom, 1.5 bath home. From the spacious backyard, the storage shed, and the central AC and humidifier, to the ceiling fans, the thermo-pane bay window,

freshly painted exterior and interior, and the newly installed insulated automatic garage doors, you will fall in love with this one right away. The house's finished basement provides two extra rooms. Less than 10 minutes to J.B. Nelson elementary school, 2 minutes to Fermilab. \$219,900 for sale by owner. Call 630-879-0815 for viewing.

WANTED

- Willing to buy power cord for Mac Powerbook 520 or sell Mac without power cord. Contact Joe Lach at x4103 or lach@fnal.gov
- 80cc to 125cc dirt bike. Contact Frank at x6823 or email mccono@fnal.gov
- Female to share a house near Fermilab. Call Sheila at 393-4473.
- Crafters for Streamwood's Summer Festival, July 28 & 29 2001. Booths available for craft fair of original handmade crafts and art. Fair is outdoors, with easy access. For flyer call x4505 or email lambertz@fnal.gov

FOR RENT

- House to share in West Chicago, North side. Close to park and train, \$600 per month plus one month security deposit. No pets, no smokers, half of utilities. Call Ron 630-231-8569 (evenings) or 630-231-2955 (daytime).
- Apartment in West Chicago, North side. Walk to park and train. 2nd floor vintage 2-flat. 2 bedrooms and office, no pets. \$850 per month plus utilities and one month security deposit. Call Ron at 630-231-8569 (evenings), 630-231-2955 (daytime).
- 5 acres in Wayne. Looking for responsible party to farm or keep animal on property. 2 stall barn, fenced, easy access to Pratt Wayne Woods Trails. Used for horses last 30 years, never tilled or treated chemically. Contact Mark at 630-840-4776 or markl@fnal.gov

CARPOOLING

- Interested in carpooling from Sycamore? Call x5193 or email tsmeier@fnal.gov

LABNOTES

FINANCIAL NEWS

A new addition to the Business Services Section website, "Training Guide for Reading and Understanding Financial Reports," is now

available. The new site is located on the Business Services Section home page www-bss.fnal.gov. Click on the **On-line Services** tab, then click on **Training**.

FESTA ITALIANA

In conjunction with the Users' Annual Meeting, Festa Italiana will be held in the Kuhn Barn on Monday, June 11 beginning at 8 p.m. For more information, contact Giorgio Bellettini x2986, email giorgiob@fnal.gov.

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



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