

# FERMI NEWS

F E R M I L A B

A U. S. D E P A R T M E N T O F E N E R G Y L A B O R A T O R Y



Lepton-Photon 2003 **8**

Photo by Fred Ullrich

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**ON THE WEB:**  
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[www.fnal.gov/pub/ferminews/](http://www.fnal.gov/pub/ferminews/)  
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# **FERMINNEWS:** From *Village Crier* to Global Village

by Mike Perricone

The publication now called *FERMINNEWS* was established in 1969 as *The Village Crier*, named for the original Village where most of Fermilab was headquartered on the east side of the 6,800-acre site.

The Village remains alive and well, though Fermilab's headquarters has long since shifted to 16-story Wilson Hall. Renamed in 1978, *FERMINNEWS* has evolved from a hometown journal to a newsmagazine with a worldwide circulation of nearly 14,000—a readership now encompassing a global village of high-energy physics.

As Fermilab Director Michael Witherell recently said in his welcoming remarks for the Lepton-Photon 2003 conference: "At an international symposium like this we celebrate not only the vitality of our science but also the international nature of particle physics...I would like to take this opportunity to reaffirm that we will continue to move steadily in the direction of a more internationally-linked scientific community. It is the only way for us to pursue our science, and it serves all of our home nations as well."

During its publishing history, *FERMINNEWS* has sought to look both inward, with news of the laboratory for its internal readership, and outward, with news of high-energy physics for its readership beyond the laboratory. With the advent of *Fermilab Today*, the lab's daily e-journal ([www.fnal.gov/today/](http://www.fnal.gov/today/)) launched on July 21, 2003, internal communications took an energetic new direction, with possibilities still to be imagined. As a result, the time seemed right for *FERMINNEWS* to expand its outward reach—to serve the laboratory and our science by speaking more directly to that global village of high-energy physics.

With this issue, dated September 2003, *FERMINNEWS* now comes to you monthly. There are more changes on the horizon, in both content and design. As a monthly, *FERMINNEWS* will strive to offer a greater degree of perspective and context for the developments we report. We will also strive to extend our reach and bring you more often news from such leading centers of high-energy physics research as Stanford Linear Accelerator Center in California; CERN, the European Particle Physics Laboratory in Geneva, Switzerland; DESY (*Deutsches Elektronen-Synchrotron* in Germany); and KEK, the High-Energy Accelerator Research Organization in Japan.

*FERMINNEWS* might look the same for a while, but you can't judge this new outlook by its cover. ☺



## COLLABORATING INSTITUTIONS

### Brazil

University of Campinas  
University of Sao Paulo

### France

College de France

### Greece

University of Athens

### Russia

ITEP-Moscow  
Lebedev Physical Institute  
IHEP-Protvino

### United Kingdom

University of Cambridge  
University College, London  
University of Oxford  
Rutherford Appleton Laboratory  
University of Sussex

### United States

Argonne National Laboratory  
Brookhaven National Laboratory  
California Institute of Technology  
Fermi National Accelerator Laboratory  
Harvard University  
Illinois Institute of Technology  
Indiana University  
Livermore National Laboratory  
Macalester College, Minnesota  
University of Minnesota, Minneapolis  
University of Minnesota, Duluth  
University of Pittsburgh  
Soudan Underground Laboratory  
University of South Carolina  
Stanford University  
Texas A&M University  
University of Texas at Austin  
Tufts University  
Western Washington University  
University of Wisconsin-Madison

## ON THE WEB:

**MINOS Experiment**  
[www-numi.fnal.gov](http://www-numi.fnal.gov)

**MINOS Institutions**  
[www-numi.fnal.gov/collab/institut.html](http://www-numi.fnal.gov/collab/institut.html)

# Startup of MINOS

## Half a Mile Underground

by Kurt Riesselmann

**S**cientists of the MINOS collaboration announced the official start of data-taking with the 6,000-ton detector for the Main Injector Neutrino Oscillation Search on Thursday, August 14. Physicists will use the MINOS detector, located deep in an historic iron mine in northern Minnesota, to explore the phenomenon of neutrino mass.

In July, after four years of mining and construction, workers finished building the first of two detectors of the ambitious MINOS particle physics experiment. After completing the hardware and testing the detector's systems, scientists announced the official startup of data-taking with the MINOS "far" detector, ahead of the scheduled completion in April 2004. Technicians will complete the assembly of a "near" detector, smaller in size than the far detector, at Fermilab in August 2004.

"This is an important milestone in the worldwide quest to develop neutrino science," said Dr. Raymond L. Orbach, director of DOE's Office of Science. "The MINOS detector in Soudan, Minnesota, together with the new Fermilab neutrino beam line, will provide a detailed look at the secrets behind neutrino oscillations. It will complement the large-scale neutrino projects in Japan, Canada and Europe. Significantly, the completion of the detector comes nine months ahead of schedule."

The looming 100-foot-long detector consists of 486 massive octagonal planes, lined up like the slices of a loaf of bread. Each plane consists of a sheet of steel about 25 feet high and one inch thick, covered on one side with a layer of scintillating plastic. To construct the detector, technicians had to transport all detector components in small sections via a narrow mine shaft in a tiny historic elevator cage that once transported miners underground.

"It was like building a ship in a bottle," said MINOS spokesperson Stanley Wojcicki, physics professor at Stanford University. "We needed to bring all the material underground and assemble it right there. The last step was to install a magnetic coil and energize it. MINOS is the only large-scale neutrino experiment underground that can separate neutrino and antineutrino interactions, allowing us to look for differences in their behavior."

At present, the new detector is recording cosmic ray showers penetrating the earth. The data will provide first tests of matter-antimatter symmetry in neutrino processes. In early 2005, when the construction of a neutrino beamline at Fermilab is complete, the experiment will enter its next phase. Scientists will use the far detector to "catch" neutrinos created at Fermilab's

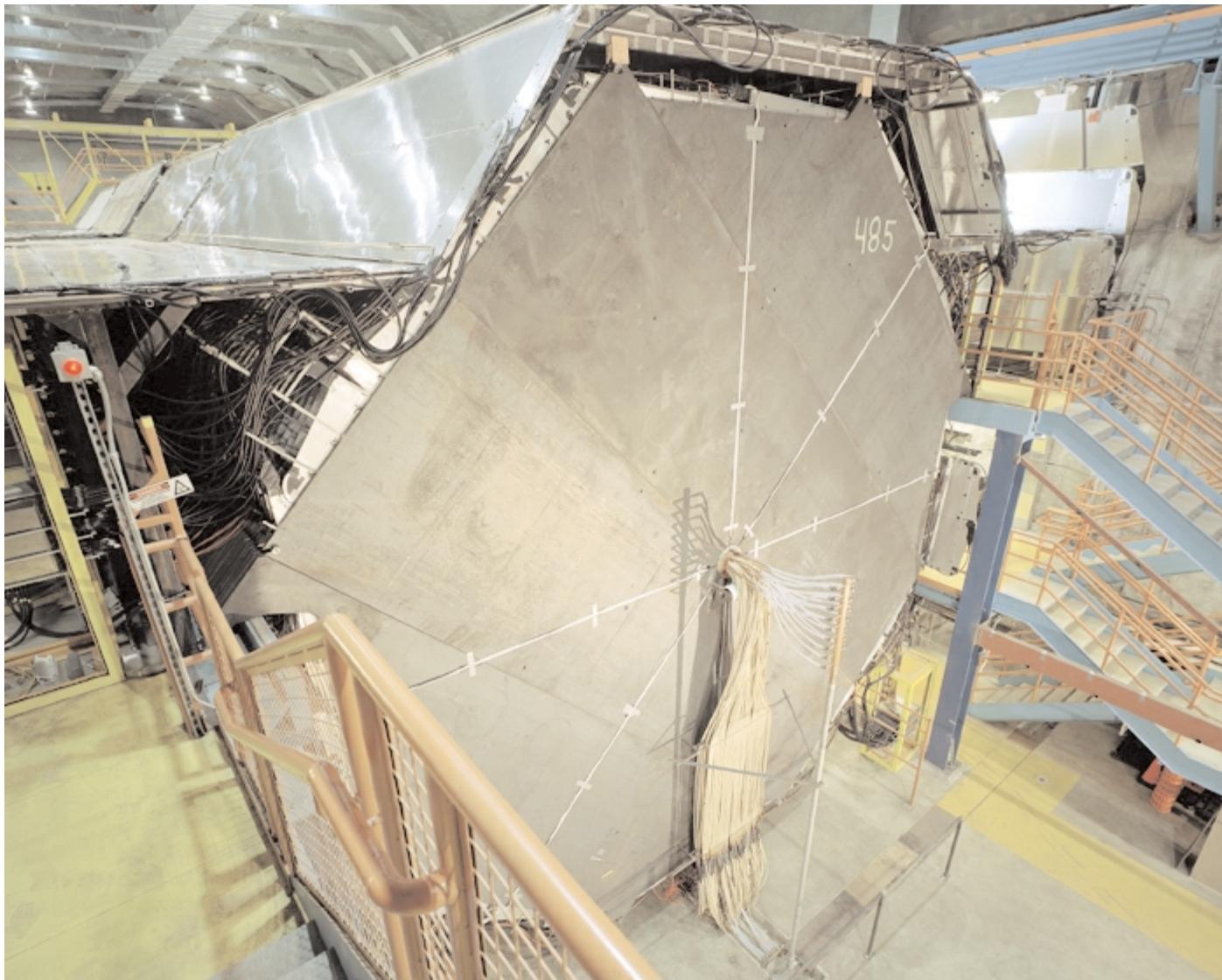


Photo by Fred Ullrich

The 100-foot-long MINOS detector consists of 486 massive octagonal planes, numbered 0 through 485. Lined up like the slices of a loaf of bread, the planes consist of sheets of steel about 25 feet high and one inch thick, covered on one side with a layer of scintillating plastic. The whole detector weighs 6,000 tons.

Main Injector accelerator in Batavia, Illinois. The neutrinos will travel 450 miles straight through the earth from Fermilab to Soudan—no tunnel needed. The detector will allow scientists to directly study the oscillation of muon neutrinos into electron neutrinos or tau neutrinos under laboratory conditions. More than a trillion man-made neutrinos per year will pass through the MINOS detector in Soudan. Because neutrinos rarely interact with their surroundings, only about 1,500 of them will make a collision with an atomic nucleus inside the detector. The rest will traverse the detector without leaving a track.

Scientists have discovered three different types of neutrinos: electron neutrinos, muon neutrinos, and tau neutrinos. The particles play an important role in stellar processes like the creation of energy in stars as well as supernova explosions.

Experimental results obtained over the last five years have confirmed that the elusive particles have mass and switch back and forth among their three different identities while traveling through space and matter. Scientists expect the MINOS experiment to provide the best measurement of neutrino properties associated with the so-called “atmospheric” oscillations.

Funding for the MINOS experiment has come from the Office of Science of the U.S. Department of Energy, the British Particle Physics and Astronomy Research Council, the U.S. National Science Foundation, the State of Minnesota and the University of Minnesota. More than 200 scientists from Brazil, France, Greece, Russia, United Kingdom and the United States are involved in the project. ☀

**www.interactions.org**

# Goes Live

Emerging from a huge gift box, webmaster Mieke van den Bergen presented the new Interactions.org Web site while balloons dropped from the ceiling.



## World's Particle Physics Laboratories Join To Create New Communication Resource

by Judy Jackson

The CDF collaboration's own rock band, "Drug Sniffing Dogs," played the Rolling Stones hit "Start Me Up." The webmaster jumped out of a giant gift-wrapped package at center stage in Fermilab's Ramsey Auditorium, while 250 balloons drifted down from the ceiling.

Thus was born the Interactions Web site, a new communication resource for particle physics around the world.

On August 12, during a special high-decibel session of the Lepton-Photon Symposium at Fermilab, the InterAction collaboration of communicators from the world's particle physics labs launched Interactions.org, a new global, Web-based resource developed to provide news, high-quality imagery, video and other tools for communicating the science of particle physics.

"The Web site, found at [www.interactions.org](http://www.interactions.org), provides a newswire with the latest developments in particle physics and related fields, as well as links to current particle physics news from the world's press," said Communications Director Petra Folkerts of the DESY laboratory in Hamburg, Germany. "It offers high-resolution photos and graphics from the world's particle physics laboratories and links to education and outreach programs."

The site also presents timely information about science policy and funding; links to universities; a glossary and a conference calendar.

"Interactions.org was developed and is jointly maintained by the InterAction collaboration," said deputy Communications director Youhei Morita, of KEK laboratory in Tsukuba,



Musicians of the CDF band Drug Sniffing Dogs played "Start me up" to celebrate the launch of Interactions.org.

Japan. "Our collaboration represents the communication staffs of all the world's particle physics laboratories. The new site responds to the growing demand for information and images from particle physics laboratories in Europe, North America and Asia."

The group pooled experience and resources to create a centralized Web site.

"Already we have hundreds of journalists, researchers and policy-makers using Interactions.org on a daily basis," said James Gillies, head of the Education and Communication Group at the CERN laboratory in Geneva, Switzerland. "This outstanding collection of materials represents the combined efforts of communications professionals from around the world."

InterAction collaborators said the current Web site is only the beginning.

"Interactions.org will give the media, the science community, policy makers, funding agencies, students, and teachers the tools to better understand and communicate the nature and value of particle physics research and its connections to other fields of science," said Judy Jackson, Public Affairs director at Fermilab near Chicago.

Physicist and communicator Stefano Bianco of INFN Frascati Laboratory, near Rome, said that users of interactions.org will find current information about the status of initiatives, people and facilities involved not only in particle physics but also in other related fields, and not only in one country but across the globe.

"Global collaboration is the foundation of success in this era of particle physics research," Neil Calder, Director of Communications for the Stanford Linear Accelerator Center in Palo Alto, California. "Interactions.org will help facilitate that teamwork." ☐

## Contributing Members:

The American Physical Society (APS)  
 Brookhaven National Laboratory (BNL)  
 European Organization for Nuclear Research (CERN)  
 Deutsches Elektronen-Synchrotron (DESY)  
 Fermi National Accelerator Laboratory (FNAL)  
 High Energy Accelerator Research Organization (KEK)  
 INFN: Laboratori Nazionali del Gran Sasso (LNGS)  
 INFN: Laboratori Nazionali di Frascati (LNF)  
 Institut National de Physique Nucléaire et de Physique des Particules (IN2P3)  
 Institute for High-Energy Physics, Protvino (IHEP)  
 Istituto Nazionale di Fisica Nucleare (INFN)  
 Thomas Jefferson National Accelerator Facility (TJNAF)  
 Joint Institute for Nuclear Research, Dubna (JINR)  
 Laboratory for Elementary-Particle Physics at Cornell University (LEPP)  
 Lawrence Berkeley National Laboratory (LBL)  
 Saclay Physics Institute  
 Stanford Linear Accelerator Center (SLAC)



InterAction members attending the Fermilab meeting. Front row from left: Judy Jackson, Fermilab; Tokio Ohska, KEK; Stefano Bianco, INFN Frascati; Petra Folkerts, DESY. Center row: Neil Calder, SLAC; Mieke van den Bergen, Interactions.org; Yves Sacquin, CEA-Saclay; James Gillies, CERN. Back row: Aldo Ianni, INFN Gran Sasso; Youhei Morita, KEK; David Harris, American Physical Society.

Photo by Elizabeth Clements

# Lepton Photon 2003:

# A Week of Interactions

by Mike Perricone

**E**ach day, they filled Wilson Hall's Ramsey Auditorium—some 800 representatives of long careers and future hopes in the global community of high-energy physics.

What they heard and saw at the 21st Lepton-Photon Symposium ranged from confirming results in top quark physics to conflicting results in B-physics; from the structure of hadrons to the structure of world-wide distributive computing; from SUSY to QCD (supersymmetry to quantum chromodynamics); from collider searches for exotic particles to explorations of the cosmic microwave background; from solar and accelerator neutrino experiments to dark matter and dark energy—all from early morning until well into the evening, from Monday, Aug. 11 until Saturday, Aug. 16.

"Particle physics is connecting with astrophysics," said Mikhail Danilov, director of the Institute for Theoretical and Experimental Physics (ITEP) in Russia. "What happens at the smallest distances affects what we see at the largest scales. We are becoming one science."

Still, the big picture is the sum of its details.

"[High-energy physics] is a very large and broad palette," said Jonathan Dorfan, director of Stanford Linear Accelerator Center (SLAC) in California. "But we still need those single ideas that transcend."

## THE B FACTOR

Some of those ideas might someday trace their origins back to this conference. If conflicting results are an indication, the discrepancies that have appeared in B-physics results might generate one of those ideas. One theorist has already said that he "cannot sleep" because of the differences reported out of the "B-factories:" the BELLE experiment at KEK, the High-Energy Accelerator Research Organization in Japan; and the BABAR experiment, at SLAC.

The experiments have reported differences in one of the decay modes of B-mesons, which are quark-antiquark pairs containing the bottom quark or its antimatter particle. BELLE has reported a decay path from the B-meson to a particle called phi K (short) that is larger than expected and with opposite sign from what is expected—presenting statistical differences from BABAR results. The BELLE results would contradict the Standard Model, the theoretical framework of particle physics for more than 30 years; the BABAR results are in agreement with the Standard Model.

"I'd say that's becoming the most interesting result in the field of B physics right now," said Nigel Lockyer of the University of Pennsylvania, who has a vested interest in the debate.

The BABAR and BELLE experiments have reported different results in the decay path of the B-meson into particles called  $\pi(+)$  and  $\pi(-)$ , a situation



Photo by Elizabeth Clements

Youhei Morita updates a KEK poster with new results.

## COVER PHOTO:

Conference participants and more than 50 scientific posters filled the atrium of Wilson Hall on Monday evening, August 11. While drinking wine and listening to live jazz music, scientists engaged in conversations on b-tagging efficiencies and 3-jet signals.

## ON THE WEB:

Lepton-Photon 2003 transparencies and streaming videos  
<http://conferences.fnal.gov/lp2003/program>



Photo by Reidar Hahn

About 700 scientists attended the Lepton-Photon Symposium at Fermilab. Because of visa problems attendance—especially from Russia and China—was down compared to previous years.

that Lockyer believes the CDF experiment at Fermilab can address over the next year. Lockyer, co-spokesperson for the CDF collaboration, says the new secondary vertex trigger at CDF offers significant experimental reach in this area of B-physics—including additional important branching ratio information from  $B_s$  to  $k(+)$  and  $k(-)$ , an area accessible only to the Tevatron. Together, the results from the B factories and CDF will provide new insights into CP violation this coming year.

"We have a whole program in B-physics that's unique to the Tevatron," Lockyer said. "It's been made possible by the SVT, which was developed by Luciano Ristori (of CDF and Italy's INFN-Pisa). With the SVT, we trigger on B-mesons, which has allowed us to find states that have never been seen before in the B-system. It will allow us to participate in the CP violation studies that the B-factories are so famous for now... "We will hopefully have enough data, and then we must analyze it. Of course, it depends on how well we do with that data."

Already, CDF and the Tevatron have established some of the best measurements in B-physics, with a prime goal of measuring mixing in the  $B_s$  sector.

"We're beginning to exploit high yields and upgraded detectors," said Kevin Pitts of the University of Illinois. "There's lots of work to do...this is a marathon, not a sprint."

## TEVATRON SHOWS ITS REACH

But either type of race begins with a single step, and results from the CDF and DZero experiments that showed up at Lepton-Photon demonstrate a significant step forward in the early days of Run II of the Tevatron. Since the onset of serious physics data just over a year ago, the upgraded Tevatron

has generated more data to its significantly revamped detectors than was generated during all of Run I from 1992 to 1996.

Among the early results: DZero has established the most sensitive limit to date in the search for large extra dimensions, surpassing limits set during Run I, and by the Large Electron-Positron (LEP) collider at CERN. DZero has also reported the first results from its new silicon detector close to the interaction region. Again, DZero's Run II results are drawn from more data than was produced during all of Run I. LEP has been decommissioned to make way for the Large Hadron Collider.

"The 'discovery reach' of the Tevatron is taking us into uncharted territory, places where we haven't been before," said DZero physics coordinator Boaz Klima. "We already have twice as much data written on tape as in Run I. The quality of the data is better, because the detectors are better. The energy of the machine is up 10 percent, making a big impact in cross-section. Add it all together, and we've made very significant strides even before we know what physics we'll see."

The Tevatron has been establishing luminosity records with regularity, reaching  $4.9 \times 10^{31}$  initial luminosity on Sunday, Aug. 10, the day before the opening of Lepton-Photon '03. It remains the world's highest-energy collider until LHC begins producing physics. The CDF and DZero detectors are offering combined results in top quark measurements that extend the understanding of the particle discovered at Fermilab in 1995.

Top quark measurements offer tools applicable to several other areas—for example, offering constraints in the electroweak sector, on the Higgs boson. Because the particle is so massive, top



Photo by Reidar Hahn

The directors of seven particle physics laboratories met with the press (from left): Michael Witherell, Fermilab; Albrecht Wagner, DESY; Yoji Totsuka, KEK; Sergio Bertolucci, INFN; Jonathan Dorfan, SLAC; Luigi Maiani, CERN; Robert Aymar, Director General-Elect, CERN; Mikhail Danilov, ITEP.

quark measurements also represent major areas to search for new physics; it may decay into as-yet unknown particles. In addition, the Tevatron is the only top quark "factory" until the LHC turns on.

So far, Run II results have agreed with Run I results on top mass, and close study of the top offers a whole area of new knowledge—as intense studies of strange, charm and bottom quarks have generated new knowledge and new directions. With top samples already larger than Run I, CDF, DZero and the Tevatron are positioned to answer questions approachable only at Fermilab's high-energy frontier: Is the top quark what it appears to be in the Standard Model? Or is there actually new physics lurking around this heaviest of the quarks?

"A very rich top physics program is underway,"

concluded Patrizia Azzi of INFN-Padova, in her presentation on top quark measurements. "Let's see what the top quark can do for us."

It will be at least 2007 before physicists can see what the LHC can do for them, but CERN Director-General Luciano Maiani declared that the new machine could be completed in late 2006, with commissioning and first beams injected in the spring of 2007. Maiani also predicted the first collisions by mid-2007 at LHC. He reported that the fiscal difficulties of 2001 have served to refocus the laboratory, with LHC progress now monitored by new control tools in addition to classical peer review committees. He described the production, installation, and integration of machine and detector components as reaching what he termed "cruising speed."

## Rosen's world view: INTERNATIONALISM and



Peter Rosen, the DOE Office of Science's Associate Director for High Energy & Nuclear Physics, made a point of offering an international welcome at the start of Lepton-Photon 2003 in Ramsey Auditorium. In fact, he made seven points—in English, Japanese, German, French, Italian, Russian and Spanish.

"This is a highly international field, and it has a long tradition of being a highly international field," Rosen said. "It's one of the features that is extremely important from the point of view of the success of the field. The achievements in the field have come about because we are able to get talented people from all parts of the world, and we are able to bring together resources from so many different parts of the world. That's something we must not lose at any time."

Rosen also stressed the Tevatron's pre-eminence.

"The Tevatron is, and will be for the next five years, the highest-energy collider in the world," he said. "Hadron physics has a tremendous variety of different processes and subfields of high-energy physics, and the Tevatron is right at the forefront of that variety of physics, right now."

Rosen wanted more time to weigh the early physics results from CDF and DZero in Run II, but he emphasized that data was invaluable to the discovery process: "You have to have the data in order to learn how best to extract the physics from it." The process is a dynamic one, he said, and people rising to a challenge can produce surprising results.

"The example that's most telling in this respect is the Main Injector," he said. "If you go back to the official documents when the Main Injector was first put into the budget in 1991 or '92, the reason for building it was for the increase in luminosity because,

## GOOD NU'S AND FUTURE VIEWS

With the worldwide “neutrino oscillation industry” soon to be augmented by results from Fermilab’s short-baseline Mini BooNE experiment, and with the long-baseline MINOS detector now complete and taking cosmic ray data, theorist Alexei Smirnov of Italy’s International Center for Theoretical Physics, and Moscow’s Institute for Nuclear Research, commented on the “enormous progress” in determining neutrino masses and mixings, and in studies of the properties of the mass matrix. Still to come are experiments performing precision measurements of neutrino parameters.

“Apart from that,” Smirnov concluded, “we will need results from non-neutrino experiments from astrophysics and cosmology, from searches for proton decay and rare decays, [and] from future high-energy colliders.”

The issue of the future was on everyone’s mind, and Berkeley theorist Hitoshi Murayama took on the challenge of envisioning what lies ahead for a field encompassing strings, supersymmetry,

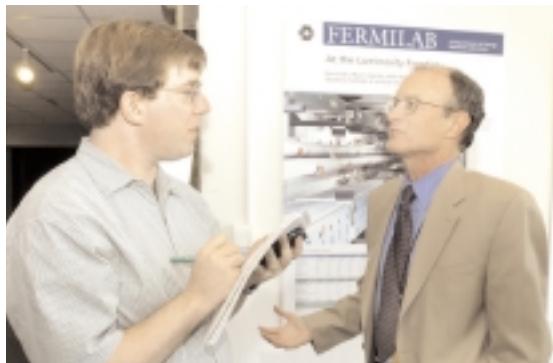


Photo by Reidar Hahn

SCIENCE Magazine reporter Charles Seife questions Fermilab director Michael Witherell.

hadrons, dark matter, neutrinos, big machines and numerous other areas of focus—including politics—to be explored at the trillion-electron-volt level.

Stressing the synergy of search building on search, of result building on result, Murayama drew an array of Big Questions confronting the field, from the “horizontal” (such as: *Why are there three generations of matter? What is the origin of the matter-antimatter asymmetry in the universe?*) to the “vertical” (*Why are there three unrelated gauge forces? Why is the strong interaction strong? Is there a unified description of the forces?*). He described questions originating from The Heavens (*What is dark matter? What is dark energy? Why is the universe so big?*) and from Hell (*What is the Higgs boson? Why does it have negative mass-squared? Is it elementary or composite?*).

Murayama’s conclusion: from any angle, the outlook for the next 20 years is a bright one. Many long careers and future hopes are dependent on that assessment. ■

Photo by Deborah Guzman



Physicist Gustaaf Brooijmans (second from left) welcomed conference visitors to the new DZero exhibit area.

## TEVATRON are critical to HEP

the words were, ‘we’re almost certain to see the first observation of the top quark.’ However, even before the Main Injector was built, we discovered the top quark here at the Tevatron. That was because people discovered clever ways of extracting the physics. I think that’s an important example of where people who are faced with a challenge of going after something will become very clever and invent new ideas, new ways of approaching the data.”

Rosen, who staked out a front-row seat throughout L-P ’03, said he was encouraged and “very impressed” by the number of young presenters.

“The quality of the talks was very high,” he said. “Obviously there are a lot of young people out there in the field who are very talented not only as physicists but in terms of presenting their work.”

“I haven’t immersed myself in a conference like this for many years,” Rosen added. “It’s been a lot of fun.”

—Mike Perricone



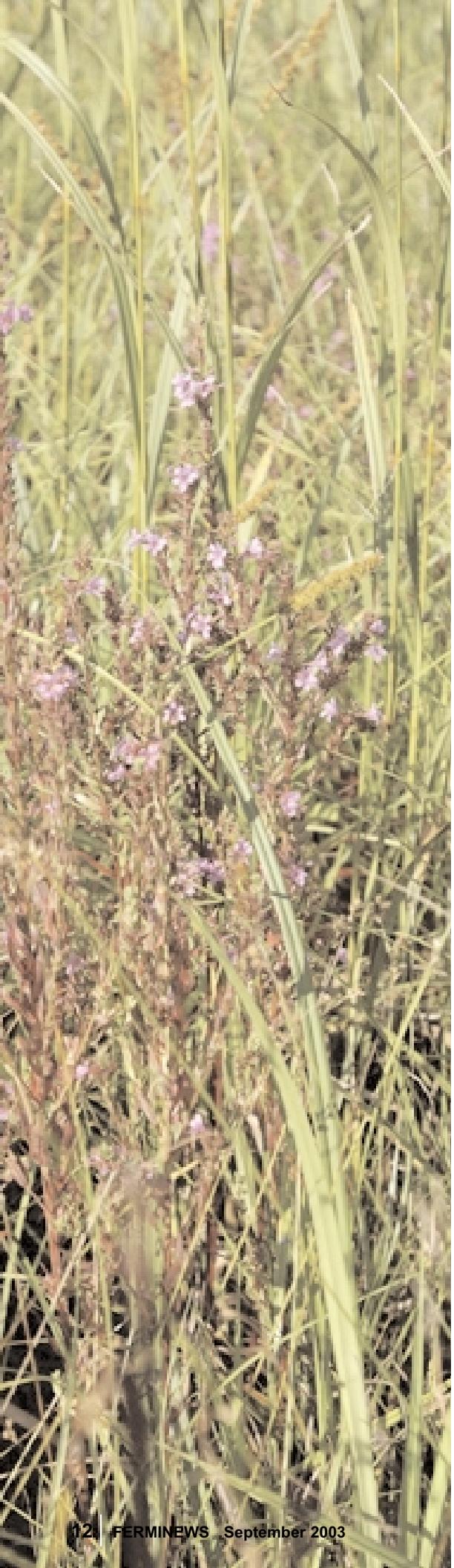


Photo by Deborah Guzman

# Main Injector Wetlands Mitigation Project **A S U C C E S S S T O R Y**

by Elizabeth Clements

**A**t first glance, it looks like just another field of grass.

At least, this is what the ELM Committee's Land Management Sub-Committee initially thought when they pulled up to the three acres of restored sedge wetlands inside the Main Injector ring this past July. With the two necessary items for exploring wetlands on hand, rubber boots and a gallon of mosquito repellent, it didn't take long for the group to realize, as soon as they were waist-high in the grass-like sedges, that the restored wetland is much more than just a field of grass and is actually quite a success.

According to the Environmental Protection Agency, more than one-third of the United States' threatened and endangered species live in wetlands. Thirty-one percent of the United States' plant species grow in wetlands, and up to one-half of North American birds nest or feed in them. Wetlands cover only five percent of the United States' land surface, but they are such important ecosystems that for every acre destroyed, the Army Corps of Engineers requires one and half acres to be replaced.

So in 1991, when part of the Main Injector had to be built through six acres of Fermilab's wetlands, the Army Corps of Engineers required 10.1 acres, of which 3.1 acres are sedge meadow and 7 acres are forested wetland, to be rebuilt in its place.

"We had to get a permit to fill the wetlands, and part of the terms were to replace it with ten acres of wetland in the middle of the Main Injector ring," said Rod Walton, Head of the Land Management Sub-Committee. "After we planted in 1992, the wetlands area was monitored by the Corps of Engineers for five years. In 1997, the mitigated area was well on its way, and the Corps agreed that the wetlands were good enough to close the permit. We took over the management of the area, burning it when we could. When the Land Management sub-committee recently went out to the area a few weeks ago, we were all struck by how healthy and diverse the wetlands looked."

It was a very welcome surprise because even though the Main Injector wetlands met all of the Army Corps of Engineers' requirements, most wetland mitigation projects fail. Walton explained that, as the name implies, wetlands need water, but getting the right balance is a challenge.

"Building wetlands is very tricky," Walton said. "Nationwide about 65 percent of all wetland mitigation projects fail, mainly because of a lack of water and a



Photo by Tom Peterson

This butterfly is one of the many Bronze Coppers that Tom Peterson found in the Main Injector wetland mitigation area a few weeks ago. The growing number of wetland species butterflies, such as the Bronze Copper, in the mitigated area is a very good sign that the project is a success.

poor design. The elevation is extremely important. If it's too low, you get too much water. If it's too high, you don't get enough.

"You also need the right soils and vegetation. We were very fortunate because our contractor did a nice job of grading. They also saved the soil from the Main Injector construction, and spread it on the new area. We really went beyond the basic requirements and ordered many different species of plants for the area. We took a lot of pains to do it right."

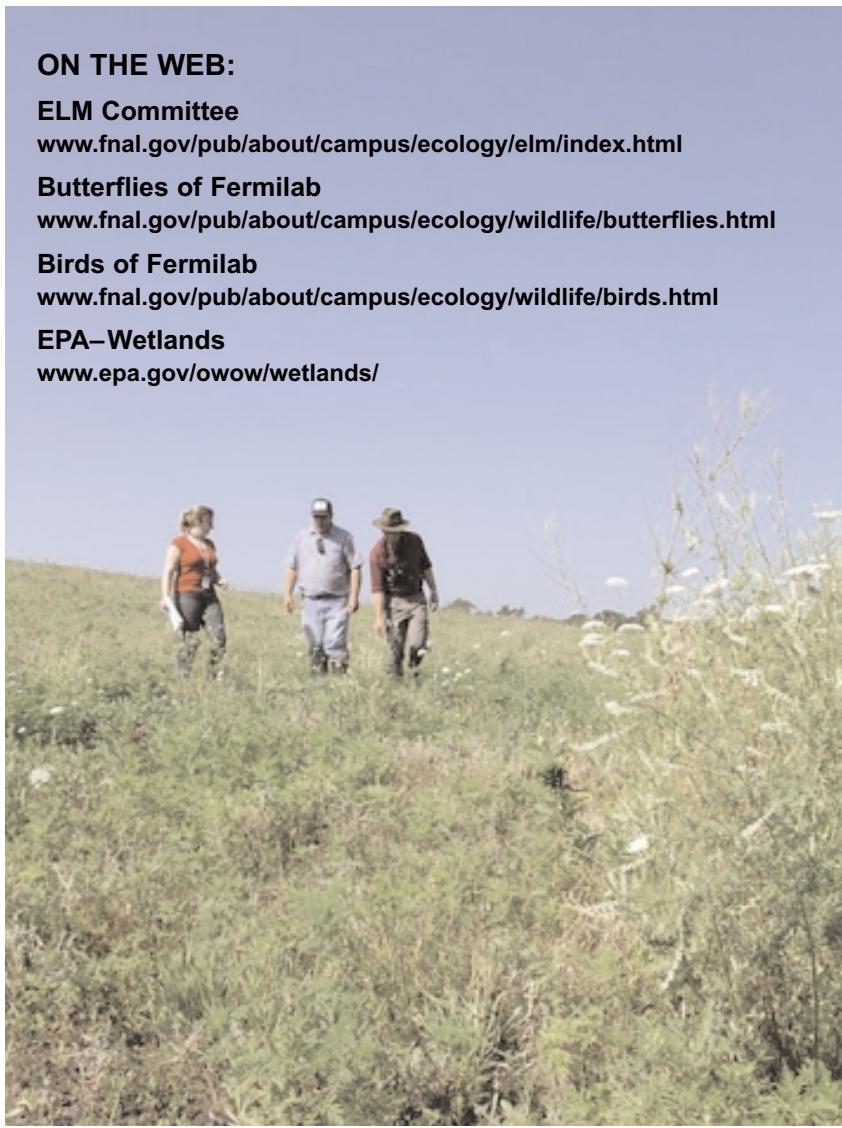
Walton explained that the number one thing that kills wetland mitigation projects is not enough rain during the first year. Getting the elevation just right is only one part of having a successful wetland mitigation project. The other factor, the water, requires a little bit of luck and perhaps a rain dance or two. "As it turned out, the summer of '93 was one of the wettest summers ever," he said. "We had super good luck. Everything got off to a really good start and continued to be healthy and to develop over the years."

The dense sedges, which are grass-like plants, are the main wetland species in the three acres of the sedge meadow wetland. Mountain mint and marsh milkweed also grow in large numbers. Bob Lootens, Chairman of the ELM Committee, is very pleased with the way that the sedges and other plants are growing into the area. "It is really unbelievable the way that the area has changed in just two years," said Lootens. "These wetlands are still young. As the sedges and plants continue to grow, it is just going to keep getting better."

The healthy and diverse plants are only one component of a healthy wetland ecosystem. Tom Peterson, ELM committee butterfly monitor, also recently found a significant number of Bronze Coppers and Dion Skippers, both wetland species butterflies, in the sedge meadows, which is a very good indication that the wetland mitigation project is a success.

"Bronze Coppers are not very common in this part of Illinois. Although they are found in other places at Fermilab, it is really neat to have that species moving into the mitigation area," Peterson said.

# A SUCCESS STORY



Left to right: Elizabeth Clements, Bob Lootens and Tom Peterson make their way down the hill that used to be a pile of dirt left over from the Main Injector construction. As one of the only hills on Fermilab's property, it is a great place to spot birds, such as the grasshopper sparrow.

"Dion Skippers used to be on a watch list, which is a stage below threatened. The Dion Skipper is strictly associated with the wetlands; its caterpillar feeds on the sedges. The variety of butterflies and the variety of plants in these wetlands make it look like a pretty good habitat."

Peter Kasper, ELM Committee bird monitor, was also surprised by the development of the Main Injector wetlands. "When we first looked at the area a couple of years ago, it didn't seem to hold much water," Kasper said. "The wetlands were a lot wetter than I expected when we looked at it more recently. The area is getting more interesting now."



The three acres of wetland inside the Main Injector ring allow sedges and other plants to thrive. A variety of butterflies and other insects call the habitat home.

Wetland bird species are not nesting in the area quite yet, but Kasper hopes that the good variety of plants and insects will start to attract King Rails, a state endangered species, and Virginia Rails. Kasper has also spotted Great Egrets, another wetland bird, in the Main Injector ring, which is another good sign. "This is clearly an area that we need to check more often," he said.

Kasper may not have found the desired wetlands bird species in the mitigated area quite yet, but he did find a significant number of Henslow's Sparrows, a state endangered species, in a section of restored prairie adjacent to the wetlands and a colony of Grasshopper Sparrows on a nearby hill that Roads and Grounds seeded with bluestem grass years ago. "The hill used to be a pile of dirt that was left over from the Main Injector construction," said Kasper. "The grass just came in recently. It was a very pleasant surprise."



Photos by Deborah Guzman

The success of the Main Injector wetland mitigation project seems to be a surprise for multiple members of the ELM Committee. "It is much better than I expected in such a short period of time," Lootens said. "The Main Injector wetland is a true success story, which is not always true for mitigated areas."

Walton couldn't agree more with Lootens. "Most mitigations are parking lots or abandoned fields after eleven years," he said. "We put a lot of effort into the project, and just about everything worked well, which doesn't happen that often." ☀

## FERMILAB ARTS SERIES

To purchase tickets for Arts and Lecture Series events, or for further information or telephone reservations, call 630-840-ARTS weekdays between 9 a.m. and 4 p.m. Phone reservations are held for five working days, but will be released for sale if not paid for within that time. Will-Call tickets may be picked up, or available tickets purchased, at the lobby box office on the night of the performance beginning at 7 p.m. When coming to this event, only the Pine Street entrance to Fermilab will be open. For more information, check out our web page at [www.fnal.gov/culture](http://www.fnal.gov/culture).



### Opening Night with Preservation Hall Jazz Band

Pre-Concert Talk at 7 p.m. in Room One  
West—Deborah Gillespie of the Chicago Jazz  
Archives, University of Chicago

Post Concert Reception

**September 27, 2003**

Tickets \$26 (\$13 ages 18 and under)

"The Preservation Hall Jazz Band had them clapping and patting their feet and, finally, marching up one aisle and down another in their high-energy, crowd-satisfying performance." —  
*Santa Barbara News Press*



### Highlights of Gilbert & Sullivan Opera a la Carte

**October 11, 2003**

Tickets \$20 (\$10)

"Opera a la Carte gives a top quality evening of entertainment... they know how to do it, how to play the audience, how to pace their performance... how to keep fresh the old melodies." —*Redlands Daily Facts*

## MILESTONES

### EXCEEDED

- The goal of 225 inverse picobarns of integrated luminosity at the Tevatron for fiscal year 2003.
- One million gigabytes, or one petabyte, of data in Fermilab's automated mass data storage system at the Feynman Computing Center.

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

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

### DECEASED

- David F. Haynie, ID 8958, PPO/Technical Centers; on August 10, 2003.
- Retiree Mitchell Tarkowski, ID 3641, formerly TD/Machine Shop; on June 28, 2003.
- Retiree Leonard M. Indykiewicz, ID 698, formerly Research Division/Mechanical Support Department; on July 11, 2003.

## Ches Léon MENU

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

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

**LUNCH**  
WEDNESDAY, SEPTEMBER 3  
*Assortment of Quiches  
with Summer Salad  
and Raspberry Vinaigrette  
Cold Lemon Souffle  
with Cookies*

**DINNER**  
THURSDAY, SEPTEMBER 4  
*Melon and Bruchetto  
Grilled Ribbed Lamb Chops  
White Bean and Fennel Puree  
String Green Beans  
Lemon Cake with Blueberry Coulis*

**LUNCH**  
WEDNESDAY, SEPTEMBER 10  
*Stuffed Pasta Shells  
Tomato, Cucumber and Pepper Salad  
Express Chocolate Parfait*

**DINNER**  
THURSDAY, SEPTEMBER 11  
*Crab Wrap  
Pork Tenderloin  
with Chipotle Sauce  
Potatoes Fonsecca  
Vegetables of the Season  
Profiteroles*

**LUNCH**  
WEDNESDAY, SEPTEMBER 17  
*Grilled Flank Steak  
Pea Pods and Mushrooms  
Ginger Flan  
with Mango Sauce*

**DINNER**  
THURSDAY, SEPTEMBER 18  
*Stuffed Peppers  
Grilled Swordfish  
with Lime Cilantro Sauce  
Rice Pilaf  
Corn Black Bean and Tomato Sauté  
Lemon Napoleons*

**LUNCH**  
WEDNESDAY, SEPTEMBER 24  
*Lemon Grass Chicken  
Jasmine Rice  
Steamed Vegetables  
Apple Turnovers*

**DINNER**  
THURSDAY, SEPTEMBER 25  
*Grilled Squid  
with Lemon Garlic  
Duck Breast  
with Cranberry Pork Sauce  
Nutt'd Wild Rice  
Roasted Beets  
with Horseradish Vinaigrette  
Hazelnut Tea Cake with Pears*

**F E R M I L A B**

F E R M I L A B  
A U. S. D E P A R T M E N T O F E N E R G Y L A B O R A T O R Y

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# CLASSIFIEDS

## FOR SALE

- '02 Audi, A4 1.8T Quattro (AWD), 5 speed manual, clean, sunroof, 6 CD changer, 4 heated seats, 16K miles, \$24,500. Contact Fred 630-840-4271 or nobrega@fnal.gov.
- '99 Chrysler LHS, 83K miles, excellent condition. Leather, moonroof, A/C, AM/FM/CD/cassette, power locks/doors/seats, alloy wheels, new transmission. Retail \$9,458. Asking \$8,500. Call 630-840-3698.
- '99 Sebring Jx 2-door Convertible. 49K miles. AC, PS/L/W/C, AM/FM/Cass, ABS, maroon and black, clean interior. \$9,000 o.b.o. Contact Lisa at 630-840-8023 or Jack at schmidt@fnal.gov.
- '98 Chevy Cavalier LS, Red, 4-door, 63K miles. A/C, am/fm cassette, PW/L/C. 4 new tires, newer brakes, looks good. \$4,850 o.b.o. Contact Amy at 630-879-3706 or dstenzel@aol.com
- '98 Ford Windstar GL, white. 94K miles, auto., ABS, A/C, PW/D/M/C, rear air, AM/FM/cassette, roof rack. Ex. cond. \$5,500. Contact Alex at 630-840-3937 or moibenko@fnal.gov.
- '97 Honda Accord, 68K miles, auto, A/C, 4-door, AM/FM cass, good tires, 1st owner, \$6,300 o.b.o. Contact 630-840-2678.
- '96 Toyota Tercel DX 2-dr Sedan, 1.5 liter, 4 cyl. fuel injected, green, automatic, 95K miles, excellent condition and mileage. Price: \$4,399. Contact Alexa at 630-362-4064.
- '96 GMC Jimmy, SLS/4x4, black, excellent condition, 84K miles, \$6,500 o.b.o. Contact Scott at 630-966-1882.
- '95 Ford Windstar minivan, AC, full optional, 120K miles, new transmission, \$3,500 o.b.o. Contact 630-840-3502, 630-584-0634, or rescigno@fnal.gov.
- '95 Dodge Neon, 4-door sedan, 107K miles, \$1,800 o.b.o. Contact 630-840-3502, 630-584-0634, or email rescigno@fnal.gov.
- '93 Ford Tempo 2-door GL coupe. 90K miles, PS, PB, AC, AM/FM radio, good condition, \$1,500 o.b.o. Contact Ron at 630-840-8864, home 630-466-1823 or email lebeau@fnal.gov.
- '93 Jeep Grand Cherokee, 99.5K miles, exc. cond., fully loaded, \$5,900. Contact 879-1764.
- '90 Pontiac Grand Prix, 100K miles, call, drive it, make an offer. Contact Phil Pfund at 630-840-4784 or pfund@fnal.gov.
- '93 Jeep Grand Cherokee, 99.5K miles, exc. cond., fully loaded, \$5,900. Contact 630-879-1764.
- '90 Toyota Corolla, 4-door, auto., A/C, original owner. Brake pads, exhaust, belts are 1-2 years. 142K mostly highway miles. Garage kept. Asking \$1,850. Contact 630-355-1253 or chendri@fnal.gov.
- '89 Geo Spectrum, 5-speed, 118K miles. Reliable, fuel efficient. Well maintained. New tires, exhaust, battery. \$750 o.b.o. Contact Dhiman at 630-452-6368 or dhiman@fnal.gov.
- '89 Pontiac Grand Prix 135K miles, new battery, fuel pump, brakes, good tires, power locks & windows, cruise control, \$850. Contact 630-840-4606.
- '88 Chevrolet Cavalier, 4-door, 159K miles. Runs fine, starts reliably, A/C, radio/cassette, power steering. Tires 2 years old. Emissions test until Sept 2004. \$500. Contact Jonas rademack@fnal.gov

- '95 Flagstaff Camper. Air conditioner, refrigerator, heater, awning with screen, new tires, spare tire, and front storage. Asking \$1,950. It's in great shape. Contact Mari at 630-978-1565 or marih@fnal.gov
- Drop-in type S10 bed liner for Chevy S10, like new \$100. Full size brass bed, \$40. 19" Zenith color TV, \$25. Old Raleigh balloon tire bike. Like new condition, \$100. Contact Mike 630-840-4663 or 630-513-7939.
- 4 PCW rims with tires, polished aluminum, size 17x7.5 5-115, fits all FM cars with bolt pattern, tires are BF Goodrich Competition, T/A size P245/45R 17. Stored most of the year. \$600 o.b.o. Contact days 630-840-3698 or eve. 847-426-6353.
- Laptop (Dell Inspiron 3800, ~2 yrs old, 5 GB hd, CD-ROM & 3.5 floppy drives, 64 MB RAM, Windows ME, Corel Suite) \$400. Printers. (HP 842c, HP 812c, and Epson Stylus Color 670). \$30 each. Contact mclayton@fnal.gov.
- 26" girls bike. 10 speed Murray Montero, all terrain, pink & grey, good condition. \$40. Contact Ken at 630-840-4225.
- BR set for teens: Dresser, desk, hutch, light oak color, \$200. Queen bed, \$50. One-bed sleeping sofa, light brown color, \$100. Dining round table with 4 chairs, natural wood, \$100. Contact 630-840-5568 or cell 630-674-7995.
- Complete wooden BR set, queen, all extra clean, 3 years old, asking \$800. Round table and 2 chairs \$80. Lots of other items, Contact 630-840-3502, 630-584-0634 or rescigno@fnal.gov.
- Waterbed, king size, honey pine color, bookcase headboard, motionless mattress, safety liner, heater, padded rails, \$100. Contact Ron at 630-840-8864, home 630-466-1823 or lebeau@fnal.gov.
- DVD player, \$100; VCR, \$50; stereo w/surround sound, \$300; X-Box and extras, \$100; Sega Dreamcast and extras \$100; microwave, \$45; vacuum cleaner, \$30; irons, \$15 and \$30; humidifier, \$40; curlers, \$15; curling iron, \$10; hairdryer, \$10; phone, \$80; water heater, \$15; toaster, \$10; humidifier, \$40; 6.0V drill, \$50; gas grill, \$75; satellite dish, \$100 o.b.o. Contact Alexa at 630-362-4064.

## WANTED

- Treadmill, good quality, bhp, power incline, pre-programmed routines; heart rate monitor, \$300-\$500 price range, Contact Ralph at 630-759-2015 or reford@fnal.gov.
- Freezer. Contact 630-840-6571.
- Short-term housing (1+BR in house/apt/condo) for roughly Oct '03 thru Feb '04. Longer if price is right. Prefer FNAL area or further west. Contact stebbins@fnal.gov or 630-840-3663.

## FREE

- 1980-1987 VW Golf/Rabbit/Jetta spare parts. 2 boxes include wiper motor, door handles, blower motor, manual, etc. Contact 630-840-6342
- Kittens looking for a good home. Born June 5th, shots on August 5th. Mixed sexes, one short-hair all black, two long-hair dark tiger stripe, and two short-hair tigers. Contact Frank at 630-840-4935, 584-4970 or nagy@fnal.gov. Please give them a good home as they are driving me out of mine.

## FOR RENT

- Beautiful 2 story, 3 BRs, 1.5 bath in St. Charles historical district. Fenced yard, deck and screened porch. \$1,300 per month, available September 2. Call 630-584-0634 or email rescigno@fnal.gov.
- Townhouse, 2-BR with loft, 1.5 baths, skylights, 2-car attached garage, whirlpool, wet bar, fireplace, hardwood floors, CAC, washer/dryer in unit, dishwasher, disposal, water softener. No pets. Near Batavia Rd. and Route 59 in Warrenville. \$1,275 per month. Available now. Contact Emily 630-462-9530.
- Two BR, two bath condo in Downers Grove, 2nd floor with balcony, clubhouse, pool, mature trees with ponds, heat included in rent, \$890. Close to I-355, 17 miles from Fermilab. Contact 630-859-3789 or treend@fnal.gov.
- 3-story English-style home in River Forest; great condition, 4+ BR, 4 bath, gourmet kitchen, walkout deck, large yard, furnished, C/A, lots of closets, grand piano. Walking distance to outstanding schools. Near airports, Metra train and Pace bus. Available now for 1 year. \$3,950 per month (incl. weekly cleaning) plus utilities. Contact 708-488-9884 or kaplan@fnal.gov.
- House in Batavia on west side of town. 3-BR, 1-bath, full basement, garage. \$1,100 per month. Contact 630-466-7558.
- North Aurora, new 2-BR, 2-bath townhouse. 2-car garage, nice deck, close to I88. \$1,445 per month. Contact 630-774-0970.
- Rooms for Rent: \$300-\$400/month, kitchen and laundry close to Fermilab. Contact Sheila Range at 393-9463.

## HOUSE TO SHARE

- Looking for non-smoking housemate. Townhouse in St. Charles, 3 BR, west of Randall Road, 15 miles from Fermilab. Clubhouse with pool, fishing pond, tennis courts and nature trails. BR is furnished. Private bath, use of guest room, large library/family/TV room with a place to set up a computer. Cable ready. Rent \$700 plus utilities (roughly \$100/month plus phone). Available now. Contact Patricia Danielson 630-443-7723.

## HOUSE FOR SALE

- St. Charles, Fox River waterfront, 2 story cottage, landscaped gardens, large in-ground pool on 41 acres. Beautifully updated, move-in condition. Approx 2,900 sq. ft. 3-BR, 2.5-bath, eat-in kitchen, DR, LR, finished basement. Large 2-car garage w/boathouse & dock. Brick driveway. \$459,500. Principals only. FSBO. Contact Jon or Lynn at 630-587-9291.

## LAND FOR SALE

- 128 picturesque acres w/abundant wildlife, 6 ponds and stocked lake, completely fenced w/lots of 4 board. 8 stall horse barn w/foaling stall and feed/tack room. New 1,500 sq ft residence and much more. \$2,850/acre. Located between Bardstown & Springfield Kentucky. Contact Edie Hatfield (former employee), 859-336-0919.

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