

# F E R M I N E W S

F E R M I L A B

A U.S. DEPARTMENT OF ENERGY LABORATORY



New Species Introduced to Prairie 10

Photo by Reidar Hahn

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NEUTRINOS  
OFFER A LINK  
BETWEEN  
COSMOLOGISTS  
AND PARTICLE  
PHYSICISTS

ON THE WEB:

**NASA/Fermilab Theoretical  
Astrophysics Group:**

<http://www-astro-theory.fnal.gov/>

**Nu-Cosmo 02:**

[http://www-astro-theory.fnal.gov/  
Conferences/NuCosmo/](http://www-astro-theory.fnal.gov/Conferences/NuCosmo/)

# Meeting on NEUTRAL GROUND

*“Oh, East is East, and West is West,  
and never the twain shall meet...”*

by Pamela Zerbinos

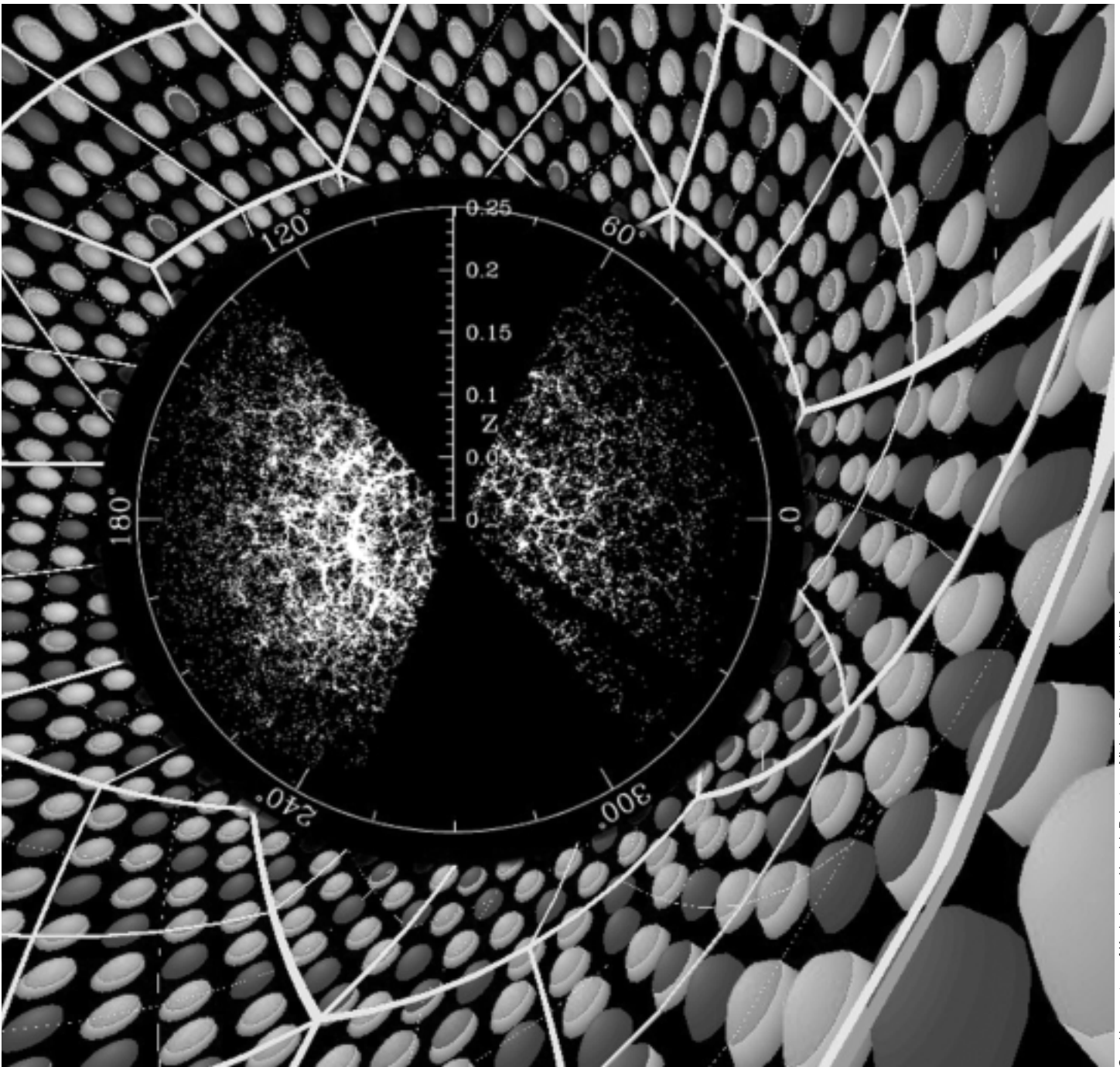
**W**hen Rudyard Kipling penned those words in the early 1890s, he probably wasn't thinking about physics. And that's a good thing, because he would have been wrong.

Let's imagine that east is particle physics, and west is cosmology. One studies the incomprehensibly small, and the other the indescribably large. Despite vast differences in methodology, the goals of the two disciplines are the same—understanding the hows and whys our universe—and they occasionally find themselves in the same place. Or rather, they would if they ever compared notes on their location. But east is east....

Or is it? The lines these days are less clear. One of the flies in the east-west ointment is the neutrino, that most elusive of particles. Neutrinos are leptons, fundamental particles, and therefore squarely in the particle physics realm. But there are an awful lot of neutrinos that were produced during the Big Bang, and they account for a small chunk of the dark matter in the universe, which gets them a lot of attention from cosmologists.

So who gets the neutrino? No one, yet, and that's the rub. Neutrinos were postulated in 1930 and still the particle is in the midst of a maelstrom of mysteries, some very basic. How many kinds are there? How much mass do they have? Where do they come from? Seventy years of neutrino research have yielded some answers, but even more questions, and particle physicists and cosmologists have started to turn to each other for new ways to find the answers.

The alliance has not always been a popular one—accelerators and detectors and telescopes are expensive, and whenever that kind of money is involved, politics inevitably rears its head. But in a year when half of the Nobel Prize in Physics went to two neutrino guys for “pioneering contributions to astrophysics,” it is becoming increasingly clear that the partnership is only likely to get stronger.



Graphics courtesy of Kevin Lesko, Hamish Robertson, Michael Blanton and Idit Zehavi.

This image is a combination of a depiction of the first event in the KamLAND detector and the equatorial distribution of a small fraction (about 60,000) of the latest main galaxy sample of the Sloan Digital Sky Survey.

Fermilab’s Theoretical Astrophysics group, hoping to build that partnership and facilitate communication between the two disciplines, recently hosted “NuCosmo-02: Workshop on Neutrino News from the Lab and the Cosmos.” The three-day conference, which was attended by more than 100 scientists, ran from Oct. 17–19 and focused on ways “to increase the dialogue between cosmologists and particle experimentalists,” said Fermilab’s Nicole Bell, who, with Kev Abazajian, was one of the main conference organizers. Both study neutrinos in the early universe. “[The fields

are] often after the same thing,” Bell said, “but they are very different and it was not until relatively recently that you could study neutrino mass by doing things like counting galaxies.”

Another of the workshop organizers, Fermilab’s John Beacom, admitted to being a bit worried that “the particle guys would show up for half the talks and then leave when the cosmologists came in. But that didn’t happen. Everyone went to all the talks.” They didn’t even sit on separate sides of the room.

# NEUTRAL GROUND



Photo by Reidar Hahn

(L-R): Janet Conrad, Bonnie Fleming and Jennifer Raaf at the bottom of the MiniBooNE detector. The 250,000-gallon detector is now filled with ultraclean mineral oil and recorded its first neutrino event on Sept. 9. Around 25 NuCosmo participants signed up for a tour of the MiniBooNE facilities, even though the experiment is taking data and everything is closed up.

The star of the conference turned out to be the MiniBooNE experiment at Fermilab, which began collecting data in August and announced its first neutrino event on September 9. The main goal of MiniBooNE is to decisively close the book on the neutrino mystery that has been driving physicists crazy: LSND. In 1995, scientists working on the Liquid Scintillator Neutrino Detector experiment at Los Alamos shocked the particle physics world by reporting evidence for the transformation of muon antineutrinos into electron antineutrinos.

The transformation of particles from one type into another, strange as it sounds, is actually an accepted physical phenomenon—quarks do it, and recently other neutrino experiments have shown that neutrinos, too, regularly oscillate. Despite this, the LSND results don't mesh with those of the other neutrino oscillation experiments. If their results are confirmed and MiniBooNE sees an oscillation signal, it will require turning the Standard Model of particle physics on its head and writing in a fourth, sterile neutrino. That is, one that does not interact with normal matter—at all.

"Theorists have been arguing about the LSND results since they came out, but only the MiniBooNE experiment can tell us the truth," said Beacom. "It isn't enough to just kill the open question of whether the results are right—it needs an oaken stake through the heart."

That same sense of urgency was invoked repeatedly throughout the conference, as speaker after speaker (the majority of whom were not from Fermilab) rose and reiterated the importance of decisive MiniBooNE results. Jonathan Link, a MiniBooNE collaborator from Columbia University, outlined the collaboration's plan to deliver those results in a few years, and went over the technical details of the experiment to satisfy the workshop participants that the experiment was well-designed and would be able to say with a very high certainty whether LSND was right.

Representatives from other important neutrino experiments also weighed into the workshop with status reports, most of them good. Super-Kamiokande, a solar and atmospheric neutrino detector at the Kamioka Observatory in Japan (and successor to the experiment that yielded Masatoshi Koshiba part of this year's Nobel Prize), is expected to begin running in January after suffering a serious setback in November of last year when one of the detector's photomultiplier tubes imploded. The shockwave caused by that implosion destroyed more than half of the 11,146 PMTs in the detector and could end up costing as much as \$35 million.

"I hate it when that happens," said Mark Vagins, the University of California at Irvine researcher giving the report. He said it will take around three years to replace the 7,000 destroyed PMTs, which are still hand-made by Japanese glassblowers. In the meantime, Super-K II (as the post-explosion experiment is known) will be running with half as many PMTs as the original. Even so, Vagins said, scientists will be able to collect new data on atmospheric neutrinos and neutrinos from the KEK accelerator, 250 kilometers away.

Super-K's neighbor, KamLAND, a reactor neutrino oscillation experiment that is the first to test the "solar neutrino problem" (discovered by Ray Davis, Jr., one of this year's other Nobel laureates) entirely in the laboratory, also had good news to report: the collaboration expects to announce its results within the next year. KamLAND, like MiniBooNE, is a rarity in the experimental world because regardless of what its results are, they will be a big deal, Vagins said. In addition to adding to the evidence for neutrino oscillation (and therefore mass), KamLAND will be able to clue geophysicists in to the distribution of radioactive elements in the Earth's crust.

The long-baseline world, consisting of experiments such as K2K, NuMI/MINOS and CNGS, was brimming with talk of going “off-axis,” a strategy that would yield better results by getting rid of higher-energy neutrinos. A neutrino beam is several kilometers wide, and detectors situated in the middle see particles of all energies. A detector off to the side would only see lower-energy neutrinos, and would therefore be a more controlled experiment.

Some of the NuMI/MINOS collaborators, who are hoping to bring their current project online in 2005, are already hard at work with other scientists on ideas for an off-axis detector. A Letter of Intent was submitted to Fermilab’s Physics Advisory Committee, who considered the letter in June of this year. “An ongoing healthy neutrino program would be very natural given the investments in the Main Injector and the NuMI Project,” Fermilab director Michael Witherell wrote, in response to the Letter of Intent.

In addition to a possible NuMI off-axis project, a Japanese next-generation long-baseline experiment, JHF, is scheduled to begin in 2007. It would be off-axis by about two degrees. Although the experiment has yet to be officially approved, Vagins, who spends most of his time in Japan, said that “decisions are being made. Money is being spent. This is going to happen.” Koshihara’s Nobel Prize makes this even more likely, Vagins said.

The cosmological side also presented several ways to study and constrain neutrino mass, all based on the idea that a universe with a massive neutrino has a different mass distribution than a universe with a massless neutrino. Some of the techniques

discussed included studying the Lyman-alpha forest (the spectral lines around a quasar), and looking at galaxy clusters.

“We don’t really know which of these techniques will turn out to be most promising,” said Scott Dodelson, who, as group leader of Fermilab’s Theoretical Astrophysics Group, had the original idea for NuCosmo. But if he had to guess, he would say gravitational weak lensing, which involves studying how the path of light is distorted by the mass distribution in the universe.

“The [weak lensing] field is really in its infancy,” Dodelson said, “and it’s very exciting.” Because the field is so young, it is still focused on measuring distortions and is not yet to the point where it is possible to study neutrino mass. However, Dodelson expects that to change within the next decade or so.

“The really remarkable thing,” Beacom said, “is that there has been so much quantitative progress in both neutrino physics and cosmology that the two disciplines now depend on each other’s results, much more than ever before.” This state of affairs is likely to continue, helped along by conferences and workshops similar to NuCosmo-02.

“We got lots of positive feedback,” Bell said. “People thought it was good that a lot of the speakers were young people out in the field, not the same faces who’ve been giving the same talk for goodness-knows-how-long.”

Other participants agreed. “I’ve been to a million meetings,” said Vagins, “but I’ve never been to one quite like this.” ☼



Photo by Reidar Hahn

One of the 8-inch PMTs used in the MiniBooNE detector. The Super-K PMTs are much larger, 22 inches in diameter, and are hand-made by glassblowers and therefore very expensive to replace. A 22-inch PMT costs around \$3,000.



Photo courtesy ICRR (Institute for Cosmic Ray Research), University of Tokyo.

The aftermath of the Super-K accident in November 2001. Photo courtesy ICRR (Institute for Cosmic Ray Research), University of Tokyo.



Photo courtesy Super-K

Workers installing a photomultiplier tube in the Super-K detector while it was down for maintenance. The styrofoam pads the workers are standing on are resting directly on top of other PMTs, and one of the theories on last year’s accident is that one of the PMTs was cracked during this process.

# From Early Postdoc to Board of Trustees

With three decades of achievement to accompany her, **Shirley Ann Jackson reconnects with Fermilab—** and with memories

by Mike Perricone

**S**hirley Ann Jackson firmly believes in nurture. But when she hasn't found it in her environment, she has always been able to rely on a strong nature.

Her experience with racial bias from other students in the 1960s, let alone being shot at in South Boston, left what she calls an "essential effect on my character," but she persevered to earn her bachelor's degree from the Massachusetts Institute of Technology. Her doctorate in 1973 was the first at MIT for an African-American woman. For Jackson, it was just the start.

Jackson continued to make news beyond her research, whether at physics laboratories, in private industry, in academia, or in government, where her appeal transcended political persuasion. Working at Bell Labs, and then as a professor of physics at Rutgers University, she was named to high-level state regulatory posts by two New Jersey governors, Thomas Keane and Christie Whitman, both Republicans. Following was her 1995 appointment by President Bill Clinton, a Democrat, as chair of the Nuclear Regulatory Commission. With her selection as president of Rensselaer Polytechnic Institute in 1999, she became the first African-American woman to lead a major research university. She made more news almost immediately by garnering, at the time, the largest donation in the annals of higher education: an anonymous gift of \$360 million.

Within the last few months, she has been named one of the top 50 women in science by *Discover* Magazine, and has closed a significant personal circle by joining the Board of Trustees of Universities Research Association, Inc., the consortium of 90 universities operating Fermilab under contract for the U.S. Department of Energy. She is now on the governing body of the laboratory where she served her first postdoctoral appointment. She was a member of the Theory group at the National Accelerator Laboratory (now Fermilab) in 1973, and again in 1975-76 following a year at CERN, the European Particle Physics Laboratory.

#### ON THE WEB:

**Rensselaer Polytechnic Institute**

[www.rpi.edu](http://www.rpi.edu)

**U.S. Nuclear Regulatory Commission**

[www.nrc.gov](http://www.nrc.gov)

*(Note: Mike Perricone is a member of RPI's Class of 1972.)*



Photo courtesy of Rensselaer Polytechnic Institute / Mark McCarty

Shirley Ann Jackson, former Fermilab postdoc and now president of Rensselaer Polytechnic Institute, is the newest member of the URA Board of Trustees. Currently, RPI has three collaborating scientists on the Sloan Digital Sky Survey.

Welcome back, Shirley Ann Jackson.

"I got a call asking me to join [the Board of Trustees], I agreed to do it, and that's about how it happened," Jackson said by telephone from her office in Troy, New York. "I think that in the constellation of high-energy physics labs, and particularly as one devoted to fundamental research, Fermilab is very important for the discoveries that will take place there. This is an opportunity for me to contribute and to help the process along. I was happy to say 'yes.' I have no specific agenda on the Board, just to be sure that the lab continues to be able to carry out its fundamental mission, and that it has the kind of scientific and financial strength it needs."

When she joined Fermilab in 1973, Jackson came to a place where founding director Robert Rathbun Wilson had posted a formal and specific human

rights policy to insure that everyone at the lab "can live and work with pride and dignity without regard to such differences as race, religion, sex or national origin." Wilson, who had originally sent the statement to Dr. Martin Luther King, went on: "In any conflict between technical expediency and human rights, we will stand on the side of human rights."

Still, there was a world and a culture beyond the laboratory.

"It was almost 30 years ago, and it was a different time," Jackson said. "I had challenges in finding a place to live. I tried to find a place close to the lab, but this was before the great expansion of Bell Labs and AT&T in Naperville and Lisle, and it was difficult and I was not successful. I ended up living in Chicago, which was not my first choice. Yet Chicago had its own benefits. I got to know

the city, and I loved being there. I had access to all the cultural offerings, and I probably made a wider circle of friends than I might have if I had lived right next to the lab.”

Even within the lab’s boundaries, principle and policy sometimes outpaced hearts and minds.

“I think it was a time when the physics community was less accustomed to having women and African-Americans engaged in fundamental research,” Jackson said. “I think I was a curiosity. From time to time, I did experience a lack of friendliness, though not the kind [I encountered] at MIT. I also spent a year at CERN, and I had a fabulous time there, between work and friends and the overall experience of living in Geneva.”

In that first year at Fermilab, visiting scientist Mary K. Gaillard became an important element of both work and friendship. They also worked together at CERN, where their friendship grew into a lifelong connection.

“Mary K. is one of my very best friends,” Jackson said. “We are still in touch and I do see her sometimes. With my move from high-energy

physics to condensed matter physics at Bell Labs, our professional paths didn’t cross quite as often. But that friendship was a very positive aspect of my time at [Fermilab].”

Gaillard, now a professor of physics at the University of California at Berkeley, and a theorist at Lawrence Berkeley National Laboratory, warmed to the opportunity of discussing her early friendship with Jackson in their Fermilab days.

“I have also valued our long-standing friendship,” Gaillard said. “I have always admired Shirley and have been delighted with her well-deserved successes, after a difficult beginning. I remember talks while trudging through the snow together on our way to lunch, from the barracks where our offices were then located in the pre-High Rise era. I also remember my blond, long-haired, youngest son announcing one day that he wanted to ‘cut his hair and make it all curly,’ that is, an Afro like Shirley had. Our friendship indeed grew at CERN, where we collaborated on a paper.”

And while Jackson would have appeared to have a promising future in particle physics, the world wasn’t turning that way.

“Ben Lee and I tried very hard to find a particle theory job for Shirley after CERN,” Gaillard recalled. “When we finally got a positive response from a good place, it was too late. Shirley had given up in disgust. She took a job at Bell Labs—which, in retrospect, probably turned out for the best. The last time we saw each other was in Washington during a National Science Board meeting, while she was still head of NRC and was about to take off for Viet Nam. We don’t see each other often, but this doesn’t affect the relationship we have.”

At Rensselaer, Jackson sees a challenge to build new relationships for the university. She concedes that the school’s general level of recognition has slipped from where it was 20 or 30 years ago, but maintains it is still well respected among those familiar with its science and technology heritage.

“We’re working to make it even better-known,” she said. “We want to strengthen opportunities for physicists. We have a specific focus on the graduate school, while maintaining the focus of the undergraduate program. A strong research program needs a strong graduate program, and having a faculty at the leading edge means educating students at the leading edge.”

She’s also building buildings. The roster of projects, ongoing or recently completed, is a long one: an \$80 million, 280,000 square-foot center



Fermilab photo

Some members of the Fermilab theory group in 1974 (from left): Ben Lee, Mary K. Gaillard, Shirley Ann Jackson and Tony Pagnamenta.



At RENSSELAER,

“We’re working to MAKE IT even BETTER-KNOWN.”



Photo courtesy of Rensselaer Polytechnic Institute / Gary Gold

Founded in 1824 by Stephen Van Rensselaer, of an old Hudson Valley Dutch patroon family, RPI has a list of alumni extending from Washington Roebling (Class of 1857), chief engineer and architect of the Brooklyn Bridge, to George M. Low (Class of 1948), head of the Apollo space program and later president of the institution. Current Institute Professor of Science Ivar Giaever (Class of 1964) shared the 1973 Nobel Prize in Physics—on work done before completing his Ph.D. The building in the foreground, West Hall, served as a hospital during the Civil War.

for biotechnology and interdisciplinary studies, a \$142 million experimental media and performing arts building, a \$33 million partnership with IBM. Her description of the new arts center is at least as enthusiastic as her descriptions of facilities devoted to technology. She is hiring 66 new faculty members over two years, with a net gain of 32 new faculty positions. She’s serious about changing the nature of the place, and that includes nurture.

Jackson’s husband, Morris Washington, is a professor of physics and assistant director of Rensselaer’s Center for Integrated Electronics. They have a son attending Dartmouth College. Jackson is well aware that a recent mailing to RPI alumni begins: “Yeah, we know. RPI wasn’t a very nurturing place when you were here.” In fact, one of Jackson’s changes, establishing an Office of the First-Year Experience, is aimed directly at altering that human factor in the traditional equation at the school.

“We’re doing specific things to improve the quality of life for freshmen and undergraduates,” she said. “We want to ensure that new students are brought

in, in a way that allows them to form kinship groups early, to learn how much the university values them. I believe we can nurture students as well as challenge them.”

And she would like nothing better than to have their education prepare them for the sorts of career challenges she has met. For example, not only did she revamp the NRC, with its 3,000 employees and \$500 million budget, but she altered the agency’s regulatory approach and believes she helped improve the international reputation of the U.S. on nuclear issues. She points to her creation of an international association of nuclear regulators.

“I believe my education as a physicist trained me to be able to look at complex problems, and see how to break them down into manageable pieces,” she said. “I found I had a natural affinity to run a complex organization. I enjoyed it, and I enjoyed being an agent of change.”

It’s in her nature. 📌

High hopes  
for new species  
introduced  
to Fermilab  
prairie

# Flutterby Butterfly

by Elizabeth Clements

**A** newest and rarest member of the Fermilab high-energy physics community is not a scientist and probably won't contribute anything to the Tevatron's success—except by adding beauty to the site.

The new addition flies, but it is not a neutrino, and we hope it won't head north toward Minnesota—or south toward Florida, for that matter. Not a scientist, not a particle.... but a butterfly.

On October 2, Doug Taron, the Curator of Biology at Chicago's Peggy Notebaert Nature Museum, released 40 Silver-bordered Fritillary caterpillars into the fields to the east of the Fermilab Village, with the help of Tom Peterson, a Fermilab engineer and butterfly expert, and Bob Lootens of Fermilab's Roads & Grounds Department. They hope that by next spring, these 40 caterpillars will grow into adult butterflies and spawn a new colony of Silver-bordered Fritillaries in the Fermilab prairie.

Although not an endangered butterfly, the Silver-bordered Fritillary is extremely rare in the Illinois region. Records from the 1930's and 40's indicate a much higher Silver-bordered Fritillary population then. A gap in the records between the 1950's and the 1980's leaves Taron and other butterfly experts to speculate over the dramatic decrease in the Silver-bordered Fritillary population in Illinois. The most likely culprit is the vast land development occurring during that time, and still continuing today. Two of Taron's goals for this project are to learn why the Silver-bordered Fritillary is such a rare butterfly, and how to increase its population in the Illinois prairie.

With a wingspan ranging from approximately one to two inches, this tawny-orange butterfly draws its name from the four rows of metallic silver spots appearing on its underside. The ideal habitat for this species is a wet meadow with an abundance of violets, where the caterpillar feeds and where the female adult butterfly lays her eggs. The key to cultivating a new colony of Silver-bordered Fritillaries is finding the perfect habitat, which Fermilab has.



COVER PHOTO:  
Doug Taron holding  
Silver-bordered Fritillary caterpillar.



Photo by Tom Peterson

Tom Peterson photographed this Silver-bordered Fritillary near Kankakee in Iroquois County. The upperside of the Silver-bordered Fritillary looks very much like the Meadow Fritillary, which you can see at <http://tdpc02.fnal.gov/peterson/tom/Butterflies/MeadowFritillary.html>. On the same page you can see the Meadow Fritillary underside for comparison. Notice that the undersides are quite different, with the Silver-bordered Fritillary having many silvery-white spots on the underside.

Taron chose Fermilab as the site to release the Silver-bordered Fritillaries because Peterson had spotted some Meadow Fritillaries on one of his butterfly monitoring walks in June 2001. Peterson, who has recorded over fifty species of butterflies at Fermilab, knew that the Meadow Fritillaries (from the same family as the Silver-bordered Fritillary but not as rare) shared the same habitat and violet host plant. A member of the Northern Illinois Butterfly Monitoring Network, Peterson knew that Taron, the network director, had been looking for a location to release a colony of Silver-bordered Fritillaries.

Lootens, Peterson and Taron settled upon the field to the east of the Village, where Peterson had spotted the Meadow Fritillaries. This site is not only a perfect habitat for the Silver-bordered Fritillary because of the abundance of violets, but also because of the surrounding power lines and railroad tracks, which limit the development and mowing of the area.

“It will be interesting to see after they have been released how they disperse here on site,” Peterson said. “Years from now this area could have many Silver-bordered Fritillaries all from this one action.”

For Taron, the Prairie Restoration Project at Fermilab was the perfect place to reintroduce the Silver-bordered Fritillary to Illinois. “Fermilab has a world class prairie restoration,” Taron said. “I would like to learn how to include rare species like the Silver-bordered Fritillary more routinely in prairie restorations.”

After receiving a British Petroleum (bp) Leader Award for funding, and a permit from the Illinois Department of Natural Resources, Taron set out with a butterfly net for the Commonwealth Edison Prairie in Grundy County in early September to gather a group of female Silver-bordered Fritillaries. Taron confined the adult females in cages containing violets, which stimulated them to lay eggs and grow into the caterpillars that he released at Fermilab.

# Butterfly



Photos by Reidar Hahn

Bob Lootens and Tom Peterson used the white markers to indicate the location of violets. Doug Taron used a fine paint brush to urge the caterpillar out of the plastic container and onto the leaf of a violet—which soon became lunch for the very hungry caterpillar.

If everything goes according to plan, the Silver-bordered Fritillaries will hibernate through the winter, form their chrysalises in the spring and grow into adult butterflies in May or June of 2003. Fermilab will be monitored for Silver-bordered Fritillaries over the next several years. Taron expects to find low numbers for the first year or two, followed by a hoped-for increase in the population. But as with any experiment, nothing is guaranteed.

"This is not something with a lot of precedent. We will not know how things are going to behave and grow," Taron said. And recognizing that patience is a virtue when it comes to butterflies, he added, "This is not a project for the impatient."

Although many new plants have been introduced to the prairie, Lootens believes that this may be the

first new animal introduced to Fermilab as part of the Prairie Restoration Project. Lootens regards this groundbreaking introduction of a species as bringing the Prairie Restoration Project one step closer to being complete.

"Every part of the ecosystem is a building block. Any time that you can put a building block back in nature, it makes it more whole," Lootens said. "As the ecosystem heals, we expect more [animals] to come in such as the Sandhill Crane. We hope that they find us."

Taron echoed the sense of completion.

"Every piece of the ecosystem does something," he said. "We don't always know what every piece does, but every piece does something. Anything that you can do to make a restoration more complete is worth doing." 🌱

the

### Andy Mravca honored



Fermilab Director Michael Withereff and U.S. Department of Energy Area Manager Jane Monhart have signed a joint proclamation naming the laboratory's newest cooling pond for Andy Mravca, retired former manager of the DOE Fermi Group, whose distinguished 42-year career began with the

Atomic Energy Commission, DOE's predecessor agency.

The proclamation was presented to Mravca's wife at the DOE Area Managers National Conference on October 29.

Andy's Pond was created for cooling water when the Main Injector was built. David Nevin, head of the Facilities Engineering Services Section, explained that the pond is a vital component of the lab's infrastructure supplying water needed for physics experiments.

"Andy's Pond is an attractive location and will forever link Andy Mravca to the science conducted at Fermilab," Nevin said.

Mravca was in charge of engineering oversight as Fermilab (then the National Accelerator Laboratory) was being designed and built. He worked closely with the lab's founding director, Robert R. Wilson to establish the architecture and infrastructure that shapes the laboratory to this day. In 1973, Mravca was reassigned to DOE's Clinch River Reactor project. He returned in 1980, serving as DOE Fermilab Area Manager until retiring in 1999.

"Andy loved Fermilab," said DOE Deputy Area Manager Jim Miller. "Other than Robert Wilson, no person had more influence on the development of Fermilab than Andy Mravca."

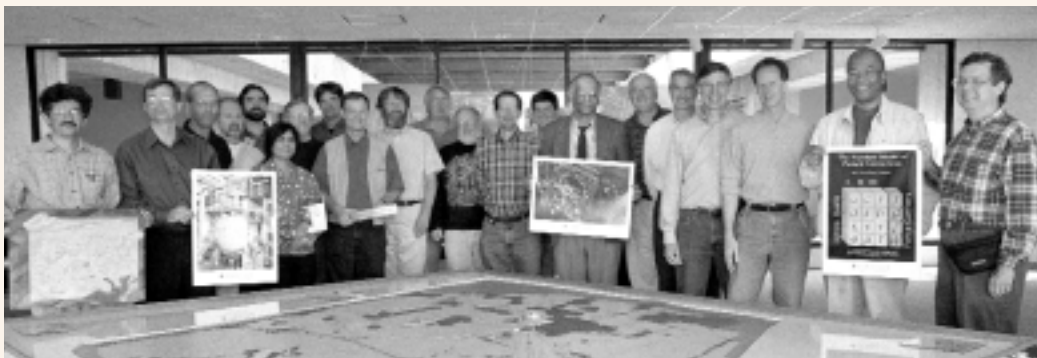
A plaque commemorating Mravca's contribution will be placed on the shore of Andy's Pond. Donations from individuals, to help cover the cost of the plaque and the event, are being

accepted and are greatly appreciated. Those interested in making a contribution should contact Judy Treend in the Office of Public Affairs at x6633.

Checks should be made out to "Mravca tribute."

Anyone donating \$100 or more will be recognized at the ceremony honoring Mravca.

of



### Visitors regain limited recreational access to Fermilab

With site-access restrictions still in place, Fermilab directors and Department of Energy officials have come up with a temporary solution to bring science-minded people back on site: the Ask-a-Scientist visitor's pass.

Every Sunday, from 1:30 p.m. to 3:30 p.m., people interested in meeting some of the lab's scientists may come and register at the Pine Street entrance, where they receive a free pass to the Ask-a-Scientist program. The pass allows visitors to drive to Wilson Hall and proceed to its 15th floor, where they can view the

the

entire Fermilab site and the surrounding area. Two scientists are on hand to answer questions such as “Why does Fermilab have buffalo?” and “What is dark matter?”

Wilson Hall remains closed to the public at other times, but people can sign up for guided tours by calling 630-840-5588. The Lederman Science Center, which features hands-on science displays for children K-12, welcomes visitors Monday through Friday from 9 a.m. to 4:30 p.m. and every Saturday from 9 a.m. to 3 p.m.

Visitors interested in pursuing outdoor activities at Fermilab are again allowed to park their car at either the Pine Street entrance or Batavia Road entrance and access the Fermilab site by bike or by foot. The site is open for recreational use from 6 a.m. to 8 p.m., seven days a week. From fishing to bird watching to hiking a mile-long prairie trail, the Fermilab site offers a variety of recreational activities. For more information, please call 630-840-3351 or see the Web pages at [www.fnal.gov/pub/visiting/](http://www.fnal.gov/pub/visiting/).

In September 2002, security concerns again led DOE officials to close the Fermilab site to the public, suspending the Ask-a-Scientist program and other activities. Easement of restrictions and introduction of the new visitor's pass has allowed scientists to restart the program, which in the past drew about 30 visitors per Sunday afternoon.

## Teacher of the year



Bob Grimm, the 2002 Illinois Teacher of the Year, recently visited Fermilab to demonstrate the new Tevatron display that he built for the Lederman Science Center. Grimm is a physics teacher and science department chair at the William Fremd High School in Palatine, Illinois. He usually visits the Lederman Science

Center once or twice a month and has taught summer courses at Fermilab since 1988.

## Happy birthday— ten times and eighty times

The Leon Lederman Science Education Center marked its 10th anniversary on Sunday, October 20 with a cake, a crowd and a bright new sweater for Lederman, the Fermilab director emeritus and 1988 Nobel Laureate who is enjoying an extended (and well-deserved) celebration of his 80th birthday.



Gathering to celebrate the 10th anniversary of the Lederman Science Education Center are (from left) Spencer Passero, Gayle Stephens, Priscilla Meldrim, LaMargo Gill, Sue Mendelsohn, Michael Witherell, Leon Lederman, Marge Bardeen, Diana Smailus, Laura Mengel, Liz Quigg, Nancy Lanning, Melissa Clayton, Tom Jordan

## CALENDAR

### FOLK CLUB BARN DANCES

There are two Barn dances in November. Sunday, Nov. 10 at 6:30 p.m., the music is by the Good Intentions Paving Co. with calling by Paul Watkins. Sunday, Nov. 17 at 2 p.m. the music is by Danny Miller and Friends with calling by Paul Ford. Barn dances are held in the Warrenville Community Building and feature traditional square and contra dances. Admission is \$5 for adults, \$2 for age 12-18, and free for under 12 years

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

old. For more information contact Dave Harding (x2971, [harding@fnal.gov](mailto:harding@fnal.gov)) or Lynn Garren (x2061, [garren@fnal.gov](mailto:garren@fnal.gov)) or check the webpage at <http://www.fnal.gov/orgs/folkclub/>.

### ASK-A-SCIENTIST AT WILSON HALL

The popular Ask-A-Scientist program has returned to the 15th floor of Wilson Hall, every Sunday from 1:30 p.m. to 3:30 p.m. Scientists will meet visitors to answer questions ranging from "What is dark matter?" to "How do you accelerate a particle close

to the speed of light?" Visitors must use the Pine Street entrance on the west side of the lab, and obtain the special "Ask-A-Scientist" pass to proceed to Wilson Hall.

### WHAT'S NEW?

Find out what's happening at Fermilab. Sign up and receive the weekly "At Work" email every Friday, with news and events from around the lab. Visit [www.fnal.gov/faw/atwork/atwork\\_digest.html](http://www.fnal.gov/faw/atwork/atwork_digest.html) to read the latest issue and to subscribe to the newsletter.

## LECTURE SERIES

### FERMILAB ACCELERATORS: PAST, PRESENT AND FUTURE

Bill Foster, Fermilab physicist

Friday, Nov. 8, 2002

Admission: \$5

Thirty-five years ago Fermi National Accelerator Laboratory began its transition from a marshy patch of farmland to the highest energy Particle Physics laboratory in the world. Under the brilliant direction

of Dr. Robert R. Wilson, a group of hardy pioneers designed and constructed the world's most powerful subatomic particle accelerator and the international laboratory to conduct experiments on its particle beams. This original endeavor, as audacious in retrospect as it was at the time, will be recalled in photographs, anecdotes, and a whirlwind tour of how accelerators work in Dr. Foster's talk, Fermilab Accelerators: Past, Present and Future, taking place in Fermilab's Ramsey Auditorium on Friday, Nov. 8 at 8 p.m.

Admission to *Fermilab Accelerators* is \$5. On the evening of the event, the box office opens at 7 p.m. and will-call tickets can be picked up, or available tickets purchased, at that time. At this time only the Pine Street Entrance (from Kirk Road in Batavia) is open.

## FERMILAB ARTS SERIES 2002-2003 SEASON

### Battlefield Band

November 23, 2002

Tickets - \$19 (\$10 ages 18 and under)

### Windham Hill's Winter Solstice

Liz Story, Will Ackerman, and Samite of Uganda

December 7, 2002

Tickets - \$25 (\$13 ages 18 and under)

### Libana

February 8, 2003

Tickets - \$17 (\$9 ages 18 and under)

### Dragon's Tale: Nai-Ni Chen Dance

March 8, 2003

Tickets - \$19 (\$10 ages 18 and under)

### Quartetto Gelato

April 5, 2003

Tickets - \$21 (\$11 ages 18 and under)

### Orquesta Aragon

May 10, 2003

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

### Gallery Chamber Series

Sunday afternoons at 2:30 p.m.

Three Concert Series - \$36

Tickets for all Fermilab Events are available now. For further information or telephone reservations, call 630/840-ARTS weekdays from 9 a.m. to 4 p.m. Additional information is available at [www.fnal.gov/culture](http://www.fnal.gov/culture).

LUNCH SERVED FROM

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

\$10/PERSON

DINNER SERVED AT 7 P.M.

\$23/PERSON

## Cheez 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, NOVEMBER 6

Salmon with Sesame Crust  
Pea Pods and Water Chestnuts  
Steamed Jasmine Rice  
Plum Ginger Turnovers

### DINNER

#### THURSDAY, NOVEMBER 7

Thai Chicken Soup  
Pan Seared Sea Bass with  
Crispy Ginger Threads  
Julienne of Vegetables  
Lemon Souffle with  
Raspberry Sauce

### LUNCH

#### WEDNESDAY, NOVEMBER 13

Grilled Flank Steak  
Spicy Corn and Lima Beans  
with Tomatoes  
Amaretto Cheesecake

### DINNER

#### THURSDAY, NOVEMBER 14

Steamed Mussels with Garlic  
Thyme and White Wine  
Roasted Leg of Lamb  
Mushroom Risotto  
Sautéed Spinach  
Chocolate Hazelnut Napoleon

## F E R M I N E W S

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

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**The deadline for the Friday, November 22, issue is Tuesday, November 12, 2002.**

Please send classified ads and story ideas by mail to the Public Affairs Office, MS 206, Fermilab, P.O. Box 500, Batavia, IL 60510, or by e-mail to [ferminews@fnal.gov](mailto:ferminews@fnal.gov).

Letters from readers are welcome.

Please include your name and daytime phone number.

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## CLASSIFIEDS

### FOR SALE

■ '00 Dodge Caravan, 19K original miles, AM-FM cassette, gray, just like new! \$9,000. [wkellej@fnal.gov](mailto:wkellej@fnal.gov)

■ '66 T-Bird, 98K miles, 390-V8, robin's egg blue w/white interior. Therese 879-2365.

■ Motorcycle: '84 Honda Shadow 700cc, 17K miles, \$1,400 Call Mike, x2220 or 630-556-3077.

■ Snowmobiles: Two '95 Ski Doo Touring LE 380cc, two seater with two-place tilt bed trailer. Very good condition. All for \$3,900 o.b.o. Will consider selling separately. Call Jeff, x6113 or 630-482-2770.

■ Lawnmower: Toro Model 521, 2 stage, electric start excellent cond. \$350. Call Mike x4663.

■ Tires: Four 215/75 R14 steel belted radial snow tires, less than 5K miles, \$60 for all 4. Two 205/60 R15 steel belted all season radials, new, less than 1K miles, \$50 for both. Jim, x3374, [mulvey@fnal.gov](mailto:mulvey@fnal.gov).

■ Dynamark, single stage, 2 cycle paddle type E.C. \$75. Call Mike x4663.

■ Heater: Sears console-type, natural gas, works well \$50. Call Mike x4663.

■ Two small gas chain saws, Craftsman \$45, Remington \$30. Call Mike x4663.

■ Frigidaire gas stove, white with black trim – \$100. Goldstar Microwave oven \$30. Audiovox Cell Phone with AC charger – \$50. Nokia Cell Phone with AC & DC charger – \$35. Beige leather couch 86" long, 4 yrs old – \$350. Contact [RLW58@yahoo.com](mailto:RLW58@yahoo.com) or evenings 630-964-2311.

### MOVING SALE

■ Bed frame, white, \$100, box spring \$100, or bed frame white and box spring, \$150. Computer desk \$40. Wall shelf IKEA white \$10. Coffee table IKEA black \$10. Two-drawer dresser white \$8. Shoe rack white \$8. Contact: [vkuznet@fnal.gov](mailto:vkuznet@fnal.gov), x2192.

### FOR RENT

■ Spacious bedroom with private bath on independent floor, one car garage; spacious living area shared on same floor; use of laundry and main kitchen; located in a family house in residential Naperville. 20 min. from the lab. Available beginning of December. \$495/mo. Contact [silvia@fnal.gov](mailto:silvia@fnal.gov)

■ Duplex, East Side Batavia, 214 Webster St. convenient location for Fermilab. 2 bdrm, 1-1/2 baths, 1 car garage, refrigerator, stove, dishwasher, garbage disposal, microwave, washer-dryer all included. Newly decorated. \$1,100/mo with yearly lease. Call 630-879-0231. Ask for Chuck.

■ Hinckley, 3 BR, garage, 3 season porch, appliances, close to schools and park. First mo. rent free to qualified applicant. \$950/mo and security. 630-566-4602

■ Two-bedroom villa for rent at the Orange Lake Country Club in Orlando, Florida, next to Disney World. Room enough for 8 people. Fully-equipped kitchen with full-sized appliances, plus cookware and dinnerware and more. Master suite with large whirlpool. Amenities on site include: 90 holes of golf, 80-acre lake and beach, 200,000 sq. ft. clubhouse and movie theater, 7 swimming pools and spa, tennis, racquetball, basketball courts, indoor/outdoor playgrounds, fitness center, too much more to list. Available Feb. 8-15, 2003. \$1,000. Check the website at [orangelake.com](http://orangelake.com). Call 630-840-3499.

### WANTED: LEGO BASE

■ Wanted by the Lederman SciEd Center for exhibit: a 10" by 10" gray Lego base; no longer made or sold by Lego, but in MANY old sets; please check your attic/basement and contact Sue, x5059, MS777, [mendel@fnal.gov](mailto:mendel@fnal.gov).

### WANTED: TREE SEEDS

■ Seeds from mature trees: Burr Oak, White Oak, Red Oak, Shagbark, Hickory, Bitternut Hickory, to be planted by Fermilab's Road and Grounds Department. Seeds should be separated by species, dried and kept cool. Drop off seeds at Roads and Grounds, or call Bob Lootens 630-840-3303 for pickup. The donated seeds from previous years are growing beautifully.

## LETTER TO THE EDITOR

### TO FERMINews:

I see you've made a fix to INFN and CERN in your "Corrections" (18 October 2002) but not to the substantive error about what NuTeV does—we don't measure the W-mass. I've now mentioned it in e-mails and directly to your talented and lovely editor three times from the first time it was wrong in an issue last year. Inexplicably, you've never acknowledged the mistake or corrected it and I can only assume it's a horrible quantum fluctuation. The original mistake is in [www.fnal.gov/pub/inquiring/more/acronyms.html](http://www.fnal.gov/pub/inquiring/more/acronyms.html) and you keep picking it up from there. NuTeV measures the ratio of neutral to charged current cross-sections in both neutrino and antineutrino deep-inelastic scattering, thereby extracting both

the weak mixing angle and the relative strength of the neutral and charged current interactions. We can interpret the measurement as an indirect determination of the W mass. A discrepancy from the direct measurement may be interpreted as physics outside the Standard Model, and indeed we have an approximately three-sigma discrepancy (G.P.Zeller et al., Phys.Rev.Lett.88:091802,2002.)

Thanks.

Bob Bernstein  
NuTeV co-spokesperson

P.S.: If you look at the the bottom picture on the Fermilab home page, Kevin McFarland, GERALYN Zeller, and Mike Shaevitz are pointing at this mistake.



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



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