FERMI NEWS

FERMILAB A U.S. DEPARTMENT OF ENERGY LABORATORY

Peterson's Guide to Butterflies at Fermilab 6

Photo by Reidar Hahn

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INSIDE:

MiniBooNE opens its "eyes"

by Kurt Riesselmann

The fly, like many insects, has a compound eye consisting of thousands of separate facets spread over the surface of a sphere. Each unit is sensitive to light and produces its own image, making the compound eye an excellent tool to detect moving objects.

In the last six months the MiniBooNE collaboration, intent on detecting moving particles, has created a compound "eye" of its own. Project scientists have outfitted a 40-foot spherical tank with more than a thousand photomultiplier tubes (PMTs), special light-sensitive devices shaped like large deformed light bulbs.

Graduate student Jennifer Raaf under the MiniBooNE "sky" of photomultipliers.

Photo by Reidar Hahn

"When we are done," said physicist Fernanda G. Garcia, who assists in coordinating the detector installation, "the tank will have one thousand five hundred and twenty PMTs."

Unlike the arrangement of an insect's eye, the MiniBooNE's photosensors cover the inside of the sphere, pointing to the center of the tank, which experimenters will fill with 250,000 gallons of mineral oil. That's where they expect the action to be: flashes of light that occur as neutrinos collide with oil molecules.

Neutrinos everywhere

Physicists designed the MiniBooNE experiment to "catch" neutrinos, the ghost particles of the universe. As you read this article, billions upon billions of neutrinos fly through the page—as well as through your body. Neutrinos, which are extremely hard to detect, come to Earth from the sun and other stars. Others originate from collisions of cosmic particles with the earth's atmosphere.

Scientists know very little about neutrinos, especially about their mass. Although neutrinos are expected to have only a minuscule mass, their abundance makes it possible that the total mass of all neutrinos in our universe may be larger than the combined mass of all stars.

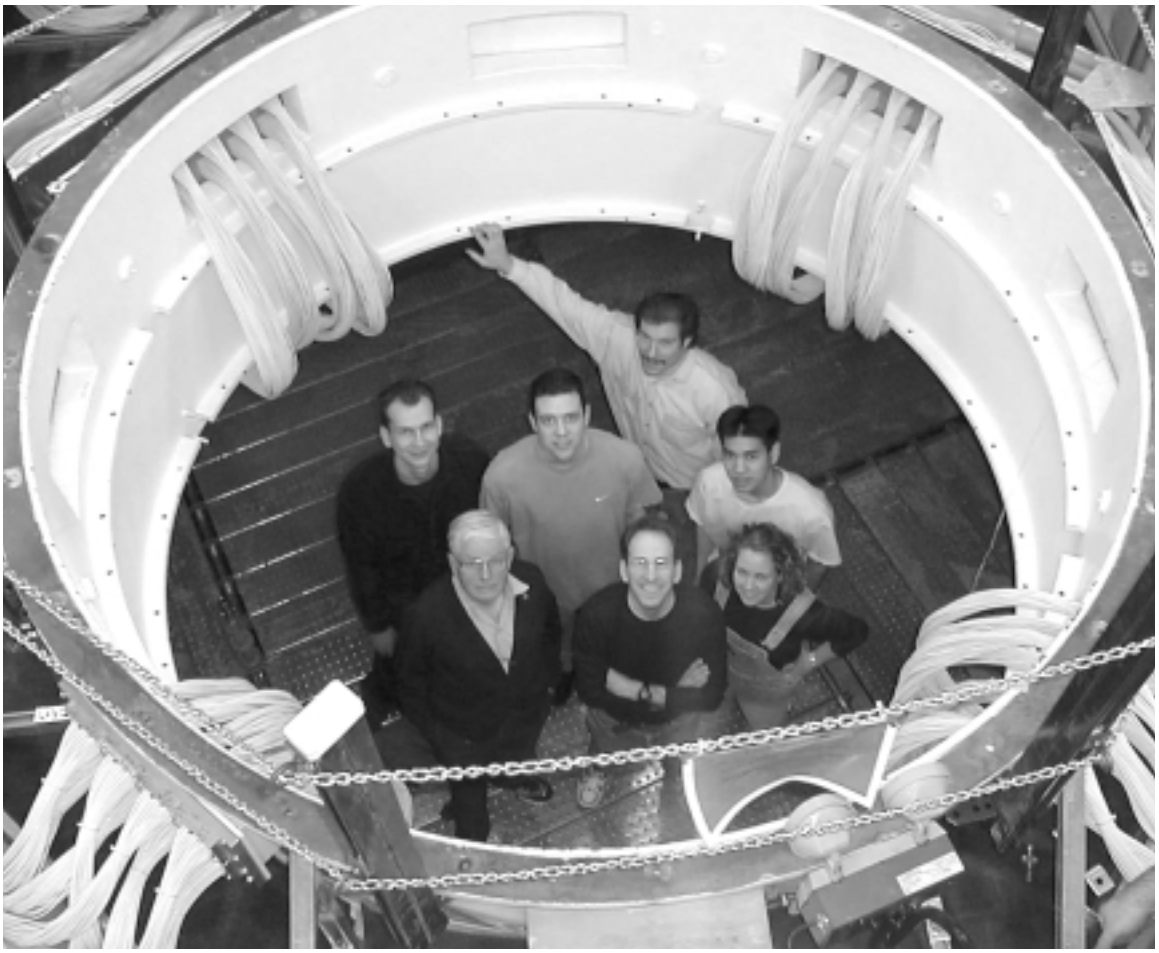


Photo courtesy of MiniBooNE

This group of people, here standing on the scaffolding inside the MiniBooNE detector, designed the inner layer of the tank and laid more than 30 miles of cable to prepare for the installation of photomultipliers. Front row: Frank Shoemaker, Peter Meyers, Jennifer Raaf; second row: Andrew Bazarko, Ryan Patterson, Mike Leung; in the back: Bill Sands. Raaf is from the University of Cincinnati, everybody else is from Princeton University.

Observing neutrinos requires large detectors and great patience. Neutrinos are able to cross the entire universe, traversing space, planets, galaxies at almost the speed of light, without leaving a mark. Only the extremely rare collision with the core of an atom stops a neutrino and reveals its presence, transforming it into a charged particle. Depending on the type of neutrino hitting an atom, either an electron or a similar but heavier particle emerges from the collision. Physicists can detect light emitted by the charged particle, thereby learning more about the properties of the initial neutrino.

Fitting it all in

The MiniBooNE detector will record about one million neutrino events every year. Its construction at Fermilab began in October 1999 with the excavation of the detector vault. Within ten months, construction crews completed the underground steel tank and its concrete enclosure.

Beginning February 2001, collaboration members from Princeton University have been installing two layers of photomultipliers, separated by an optical barrier, inside the tank. About one sixth of all PMTs sit between the tank's wall and the barrier: they will record charged particles entering the tank from the outside. All other PMTs are on the inside of the barrier: they will identify the charged particles stemming from neutrino-oil collisions.

Building the structure of barrier panels and PMTs inside the tank "is different from assembling something on a bench top," said Bill Sands, the Princeton engineer who designed the support structure for the PMTs.

MiniBooNE opens its "eyes"

"Due to space restriction, there is no crane access inside the tank," Sands explained. "Since everything has to be handled by people, we decided to use the lightest materials possible. The barrier panels, which hold the photomultipliers, are made of aluminum. Steel struts mounted to the tank bear the load of the whole structure."

The first challenge occurred even before the Princeton group began the installation.

"I had trouble finding a company to put up scaffolding inside the spherical tank," remembers Sands. "I called people at various companies and they laughed at me."

Sands and his colleagues finally found a contractor who took the job seriously. Now they are getting ready to finish the PMT installation at the end of August.

"Inserting the final panels will be very tricky," said Garcia. "But they know how to do it."

Photo by Reidar Hahn

The target hall, in which the neutrino beam for the MiniBooNE experiment will be created, is under construction.

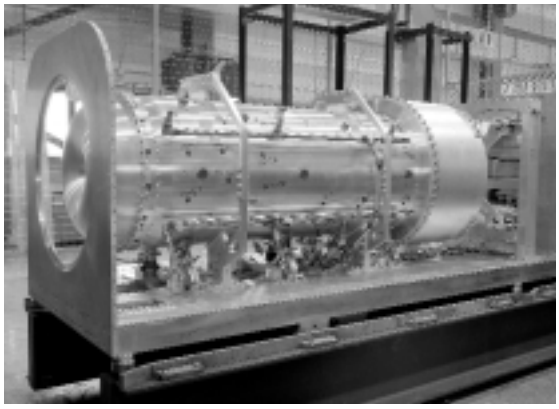


Photo by Reidar Hahn

To maximize the number of neutrinos with the right energy spectrum, physicists will install this focusing horn in the MiniBooNE beam line. In a test on July 31, the horn received its first electrical pulse with a strength of 170,000 amps.

Recycled equipment

MiniBooNE will recycle most of its PMTs from Los Alamos National Laboratory. Physicists used them in the Liquid Scintillator Neutrino Detector (LSND), which recorded neutrino events from 1993 to 1998. Richard Schirato, a scientist at Los Alamos, helps to recycle other equipment, too.

"We've also shipped parts of the electronics from Los Alamos to Fermilab," he said. "MiniBooNE will use the same amplifiers as the LSND experiment. The computers and software, however, will be different."

MiniBooNE expects to install and connect all electronics before the end of September.

Thirty tank trucks of oil

The collaboration must still decide on the type of mineral oil to use. At present, Jennifer Raaf, a graduate student from the University of Cincinnati, is conducting a series of tests. She measures the transparency of each oil sample using light with the same blue color as the flashes produced by charged particles emerging from neutrino reactions.

"Different companies put in bids for the 250,000-gallon oil contract," she said. "They all must submit a ten-gallon sample. Without knowing from which company they came, I'm testing the properties of the different samples."

The MiniBooNE collaboration has scheduled the oil delivery for the end of October, when more than 30 tank trucks will come to Fermilab. The oil of every truck will be tested before it is pumped into the detector.

Bill Louis, cospokesperson of the collaboration, expects the detector to be fully operational by December. Physicists will then begin taking data using cosmic rays to tune the detector electronics.

Photo by Reidar Hahn

Fernanda G. Garcia (right) and Sabina Aponte prepare photomultipliers which are provided to the installation crew on demand.

According to Louis, the first neutrino beam, created by Fermilab's accelerators, will traverse the detector in the spring. The high-intensity beam will cause a neutrino collision inside the tank about every twenty seconds.

Great discovery potential

In 1995, the LSND collaboration stunned the particle physics community when it reported a few incidences in which the antiparticle of a neutrino had presumably transformed into a different type of antineutrino. However, the results were subject to doubt because of the small number of events and the need for confirmation by another experiment.

The MiniBooNE experiment will collect much more data than LSND, yielding much better statistics, due to a stronger neutrino beam and hence higher event rates. A significant advantage of the Fermilab accelerator is a smaller pulse duration: the MiniBooNE neutrino beam will consist of very short high-intensity pulses, about 10,000 times shorter than the LSND beam. This greatly improves the experiment's capability of separating beam-induced neutrino events from naturally occurring cosmic-ray interactions, which take place at random times.

The MiniBooNE collaboration, consisting of about 50 physicists from 14 universities and laboratories, is eager to start its experiment. Confirming the LSND result would indicate the existence of an additional kind of neutrino beyond the three known flavors, which would in turn require physicists to rewrite a large part of the theoretical framework called the Standard Model.

"It would be fun to see a lot of people scrambling to try to explain a positive outcome," said Princeton physicist Peter Meyers, member of the MiniBooNE collaboration.

On the Web:

The new MiniBooNE homepage:

http://www-boone.fnal.gov/

Neutrinos at Fermilab:

http://www.fnal.gov/pub/inquiring/physics/neutrino/

Neutrino oscillations – what it all means:

http://www.ps.uci.edu/~superk/oscillation.html

Streaming video on Cerenkov light (5 min.):

http://vmsstreamer1.fnal.gov/VMS/Samples/Cerenkov.ram

Peterson's Guide to the Butterflies of Fermilab

Viceroy

by Tom Peterson
Technical Division—Development & Testing

Tom Peterson

Like many avid butterfly watchers, my interest started at an early age. During grade school I spent nearly every summer day roaming the Illinois Central Railroad right-of-way and the Salt Creek shoreline in Elmhurst for insects.

By high school, I had stopped mounting and preserving specimens. Instead, I was watching butterflies the way a birder watches birds, on the wing. But there's a difference: the beautiful colors and intricate patterns on butterfly wings are best viewed up close. Although butterflies often seem timid, it is surprising how often one can get very close, even close enough to coax the butterfly onto one's finger. Looking at the fine lines and spots—soft brown, vivid orange or iridescent blue—from a foot away is one of the great pleasures of butterfly watching.

Tom Peterson observes a Tiger Swallowtail in the female dark form.

Cover: Tiger Swallowtail

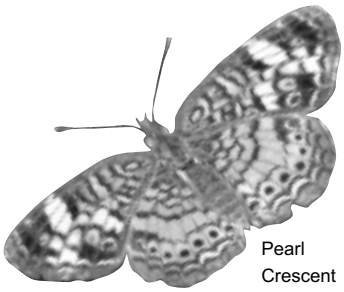
Photos by Reidar Hahn

After casually observing the butterflies during my 20 years at Fermilab, in the past few years I have begun searching the site more intensively, looking for small, local populations. With its wide variety of habitats—wetlands, prairie, and woods—the Fermilab site has hosted at least 44 species of butterflies during the past two years. Late summer is one of the best of times for viewing.

Some butterflies, like the Eyed Browns living in the wetlands inside the Main Ring, are very local in distribution. These "remnant-dependent" butterflies rarely stray from the native plants on which they depend, perhaps inhabiting an area of only a few acres. The laboratory's prairie restorations now total over a thousand acres, but I've seen no true prairie-dependent species. That may be because Fermilab's prairie is an island, with no other native prairie near enough for prairie butterflies to move back and forth on their own. All the remnant-dependent butterflies I've found so far are wetland species, perhaps because there were enough wetland remnants when Fermilab was established to "re-seed" the site's developing wetlands with butterflies. This appears not to have happened for prairie species. Unlike wetland species found on site, some of these apparently delicate creatures, including the Monarchs, Red Admirals, and Painted Ladies can travel hundreds of miles.

"If my *first glance* of the morning was for the *sun*, my *first thought* was for the *butterflies* it would engender."

—Vladimir Nabokov, *Speak, Memory*



Pearl Crescent

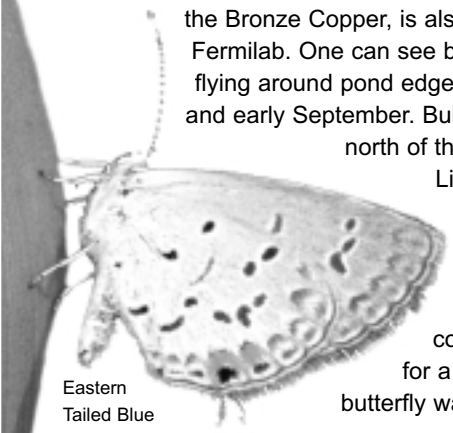
One of northeastern Illinois' rarest butterflies that is breeding onsite is the Purplish Copper, a wetland species. It always seems associated on the Fermilab site with the plant, water heartsease (Polygonum coccineum). Patches of water heartsease probably survived the agricultural period here, supporting small populations of Purplish Coppers as the larval food plant. Now more of a western butterfly, Purplish Coppers have largely died out east of the Mississippi as wetlands have been destroyed. A larger relative, the Bronze Copper, is also common at Fermilab. One can see both these species flying around pond edges in late August and early September. Bullrush Pond, just north of the Central Helium Liquefier, is a particularly good place for Purplish Coppers and a convenient place for a lunchtime butterfly walk.

Monarch (underside)

Red Admiral

Monarch

Photos by Reidar Hahn



Eastern Tailed Blue

The Interpretive Trail (starting at the parking lot across Pine Street from the Education Center) is a prime location for viewing a variety of butterflies from late June through August. One of my favorites, the Great Spangled Fritillary, likes the woods/prairie edge where the Prairie Trail nears the Big Woods. These large, black and orange butterflies with shiny silver spots on the underside of the hind wings fly from late June into August.

A butterfly that lives in old fields but has found a home in our prairie restorations, probably feeding as a caterpillar on Big Bluestem grass, is the Common Wood Nymph. Brown with two large eyespots on each front wing, it flits through the tall grass with a funny, low, bouncing flight. A close relative, the Pearly Eye, frequents an area just a short distance away in the woods.

In *Strong Opinions*, the eminent Russian novelist—and gifted amateur lepidopterist Vladimir Nabokov wrote: "I have often dreamt of a long and exciting career as an obscure curator of lepidoptera in a great museum." A short walk from my office, down a trail or into the woods, the Fermilab site opens before me just such a great museum as Nabokov dreamt of.

–Tom Peterson is a senior cryogenic engineer with a lifelong interest in butterflies.

On the Web, the Butterflies of Fermilab—
http://www.fnal.gov/pub/about/campus/ecology/wildlife/butterflies.html.

Butterflies for Kids—
www-ed.fnal.gov/lasso/butterfly_search/

INTERNS

share a summer to remember

IPM 2001

Karen Andeen
Augustana, CDF

Tom Bringley
Duke, NuMI

Sharvari Dalal
MIT, Focus

Marie Lopez del Puerto,
Universidad de las Americas, DZero

Joe Dunsmore
University of Minnesota, Photoinjector

Cassie Fallscheer
Cal Poly, DZero

Federico Gallo
Kings College, London, PPD

Carrie Hahn
University of Illinois at Chicago, DZero

Chris Lesher
Joliet Jr. College, DZero

Paretz Partensky
Brandeis, Sloan Digital Sky Survey

Matt Rahker
University of Illinois, CKM

Fermin Reygades
Universidad Nacional Autonima de Mexico, BTeV

Samuele SanGiorgio
Universita' degli Studi de Milano, DZero

Angelique Talbot
St. Andrews University, Photoinjector

Lauren Tompkins
UC Berkeley, DoNUT

by Mike Perricone

Summer is the season for the growth—in the case of Fermilab's Internships for Physics Majors program, a season for the growth of careers.

For an undergraduate, a summer of hands-on experimental work can start a career like this one: B.S. in Physics and Mathematics, U. of Kansas; Ph.D. in Physics, U. of Wisconsin; NSF Graduate Fellow, U. of Wisconsin; Sherman Fairchild Postdoctoral Scholar in Theoretical Physics, CalTech; David N. Schramm Research Fellow in Theoretical Astrophysics, Fermilab.

"When I was an undergraduate, I knew that I wanted to be a theorist," said Fermilab's John Beacom, who served summer internships at Argonne, Fermilab and the Institut Laue-Langevin in Grenoble, France. "But I thought that I should first see how the other half lives, since physics is fundamentally a science of measurement. And that exposure to research really enlarged my perspective, and convinced me that I wanted to continue in physics."

Friendships grow along with careers. Beacom also counts three close friends from that IPM summer who have built careers in the field: astronomers Geoff Bower and John Monnier, and Nima Arkani-Hamed of extra dimensions fame.

Fermilab's internship program dates back two decades, instituted by the now-retired Drasko Jovanovich, who also founded Saturday Morning Physics for high school students. Fermilab physicist Roger Dixon carries on the double-duty tradition, coordinating Saturday Morning Physics and sharing IPM duties with physicist Erik Ramberg, along with administrator Maxine Hronek.

Dixon sees the interns as an investment in the future.

"After the Snowmass conference [on the future of particle physics], the kids had a continuing e-mail dialogue on where they thought the field should be heading," Dixon said. "In some ways, their discussion might even be more important than what went on at Snowmass. These kids *are* the future of the field."

This summer's 15 interns represent the pick of 200 applicants, who submit essays on their interests and hopes, along with references and academic records. Dixon and Ramberg endure what they describe as near-heartache in culling the list, but their goal is a diverse group as well as outstanding students. Ramberg says "enthusiasm is one of the biggest criteria," and Dixon points out that Harvard doesn't necessarily outrank Joliet Junior College—in fact, Joliet JC (Chris Lesher) is represented this summer, and Harvard is not.

The interns do real work on real experiments, and receive real pay (approximating the level of other lab employees with similar experience). Hronek arranges living quarters in nearby apartment complexes, deducting rent from their paychecks. The group meets weekly for informal lectures on physics topics, and the summer concludes with a presentation from each student on the summer's work. But Dixon, Ramberg and Hronek all stress that the "off-duty" experience is equally important, and it shows in the students' assessments of their experience.

"Due in part to the multilingual and multicultural diversity of our group," says Paretz Partensky of Brandeis University, who was born in Russia, "we sometimes transform into a UN-like forum of political discussions, many of which lead us to meet dawn from the wrong side."

Angelique Talbot of St. Andrews University in Scotland concludes: "We have been made to feel so welcome and special by everyone that I would recommend an internship to every physics student—if only for that one conversation at 2 a.m. on Life, The Universe, and everything else that makes it all worthwhile."

Photos by Reidar Hahn

The interns gathered in Wilson Hall—with their advisors and a few more summer students who were unofficially "adopted" into the program. Front row, from left: Lauren Tompkins, Karen Andeen, Cassie Fallscheer, Carrie Hahn, Sharmari Dalal, Jeremy Holt, Matt Rakher, Marie Lopez del Puerto. Second row: Angelique Talbot, Sarah Hansen, Tom Bringley, Brian Gleim, Federico Gallo, Fermin Reygadas. Back row: Derek Strom, Samuele San Giorgio, Roger Dixon, Matt Seigler, Joe Dunsmore, Paretz Partensky, Maxine Hronek, Chris Lesher, Erik Ramberg.

Summing up their summer

Matt Rakher, University of Illinois at Urbana-Champaign: Worked with physicists Bob Tschirhart, Erik Ramberg and Hogan Nguyen on simulation studies for the CKM detector. *"My summer here has enabled me to learn a good deal of introductory particle physics, and to see how much work goes into an experiment even before anything gets built. The interns, physicists, engineers and everyone else I have worked with at Fermilab have been very helpful, and I can only hope the relationships I have forged here will last for years to come."*

Marie Lopez del Puerto, Universidad de las Americas, Puebla, Mexico: Chosen for IPM by Particle and Fields Division of Mexican Physics Society. Worked on DZero's Central Fiber Tracker with physicists Don Lincoln, Andrew Alton and John Anderson. *"What I've found most impressive is the general atmosphere at Fermilab, the excitement when something is made to work and when new results are published, how laid-back and helpful everyone is, and how much effort everyone puts in to make such a big collaboration work successfully."*

Fermin Reygadas, Leon Lederman Award, Hertell Foundation, Universidad Nacional Autonoma de Mexico: Worked on BTeV. *"Because it is an experiment still under development, I have been able to see how all the pieces of the detectors are designed, tested, redesigned, tested, redesigned. It's great that the internship is designed for students in the middle of college, letting us share what we have learned with our classmates back at school...the impact on science and education goes beyond the individual level."*

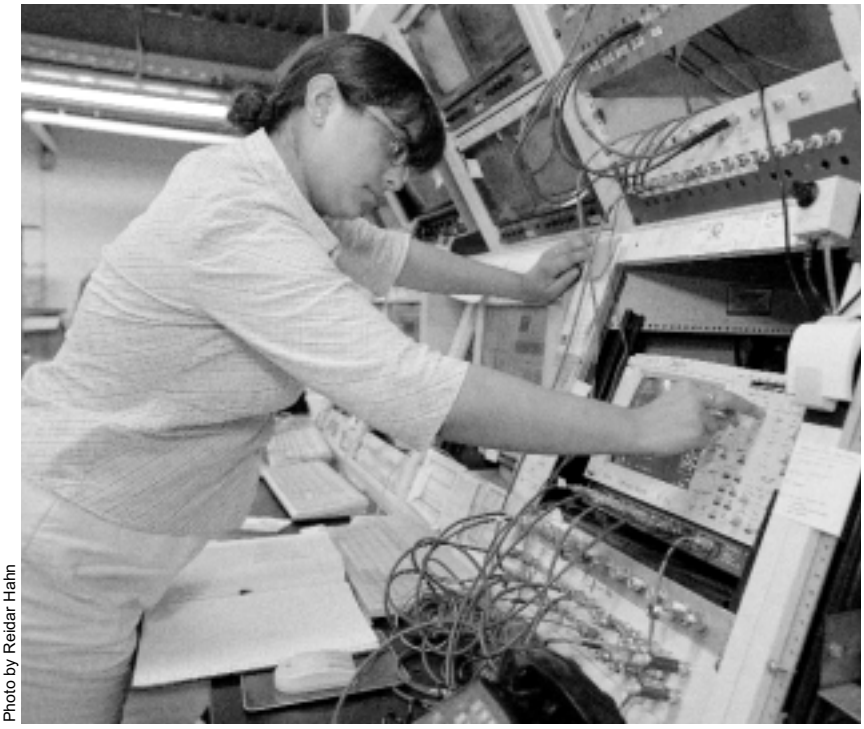


Photo by Reidar Hahn

Angelique Talbot, St. Andrews University, Scotland: Worked with physicist Helen Edwards on AZero Photoinjector, investigating superconducting TESLA cavity. *"I never expected the experiments to be so much fun—especially when trusted to turn on all the RF systems myself, ignoring the motto, 'Never let a theorist play with your accelerator.' I love walking into an office and asking, 'Can you explain this?' and receiving such an enthusiastic response. The part of the project that was most satisfying, though, was being able to complete analysis of my own data, and to make conclusions from it."*

Federico Gallo, Kings College, London: Worked in PPD with physicist Ryuji Yamada. *"Under the direct supervision of Dr. Yamada, my goal is to obtain a more precise value for the mass of the top quark. In the process, I am learning about the specifics of the creation of top quarks… I see this experience as an opportunity to look at the x-ray of the skeleton of fundamental physics, a chance to unveil its most intimate secrets in the attempt to convince myself that this science is the true intellectual love of my life. Or else."*

Lauren Tompkins, University of California-Berkeley: Worked with physicist Gina Rameika on DONUT, setting up public-interest website and analyzing data. *"Sitting in on HEPAP subpanel talks, attending press conferences after the release of the first SNO results, hearing all the gossip coming out of Snowmass… seeing textbook lessons on the Standard Model manifesting themselves as calorimeter readings or scintillator hits… have all given me an introduction to the physics world that I don't think I could get anywhere else. I'm also working with an amazing group of people, who are going to be my friends for life."*

Photos by Jenny Mullins

Paretz Partensky, Brandeis University: Worked with astrophysicist Jim Annis on the Sloan Digital Sky Survey, studying the large-scale structure of the universe. *"We are working on algorithms that will automate the identification of new galaxy clusters and verification of old clusters. This task involves painstaking programming in multiple computer languages and going to meetings where we drink enormous amounts of coffee. This experience has demonstrated my personal comfort with research and consequently boosted my confidence. I want to thank Fermilab not only for advancing my physics knowledge, but also for making me aware of the truly amazing friendship possibilities in our very diverse group of individuals."*

QuarkNet

VIDEO NEWS PROJECT
PART IV

A Student's View:

A Career in Science

A typical scientist — visions of thin, male geniuses with pale skin and a large puff of unruly white hair beginning to bald, wearing large eye-popping glasses, and, of course, long, white, immaculately clean lab coat. With these usual misconceptions comes another that I am guilty of myself: the assumption that working with science for a living is slow, boring and possibly too complex and challenging for me to make a career of.

I have been interested in science for most of my life. I know it is something I enjoy, but sometimes committing to science as a career seems intimidating and risky. Obviously, I never truly understood exactly what it is to be a scientist. However, after meeting some of Fermilab's scientists, they became less mysterious, and more real, witty, intelligent and interesting. This not only eased my fears, but also confirmed my hopes that I could fit into a scientific community. A career in the sciences has become an option, rather than a dream.

I had the opportunity to interview a Fermilab employee, Amber Boehnlein, for my group's project. We were interested in talking to her because we wanted an insider's view of Fermilab and the experiment she works in: DZero. However, what interested me about her was not what went on during the interview. Instead, it was her life, her accomplishments, and the fact that she became an instantaneous role model. Waiting for the cameramen and chatting, I immediately respected this motivated and articulate individual. As I learned more about her, I could not help but admire her achievements and background, not only because she was female, but also because she had acted upon her interests and established herself through hard work and being a self-starter.

Many misconceptions exist because most people do not interact with scientists on a regular basis. While it is true many scientists are geniuses – and some do have crazy hair – the sciences should not be intimidating. My misconceptions and apprehensions could have kept me from making a career of something I enjoy. Learning about the people behind the science has led me to new understanding and appreciation.

I hope that others will find the same inspiration I have.

Hilary Blanchard

Physicist Amber Boehnlein, here inspecting some detector electronics, is a member of the DZero collaboration. She appeared in one of the four QuarkNet videos.

The 23 students of the four QuarkNet video news teams are from:

- *Illinois Math and Science Academy, and West Chicago Community High School*
- *Perspectives Charter School, and Proviso West High School*
- *Niles West High School*
- *Maine East High School, and Walter Payton College Preparatory High School*

Archived versions of the webcast are available at

http://quarknet.fnal.gov/run2/

Photos by Reidar Hahn

Hilary Blanchard at West Chicago Community High School, the home of the Wildcats.

DATA to the PEOPLE

High-energy particle accelerator:

$ a few billion

Particle detector:

$ several hundred million

Particle physics data for experiment collaborators:

priceless

Particle physics data for physicists outside the collaboration:

worthless

by Judy Jackson

Last month, a group of Fermilab scientists took a first step toward bridging the gap between the insiders of a collaboration and the outsiders who don't have their names on the experiment's roster. As a rule, data from the trillions of collisions created by a particle accelerator make sense only to members of an experiment collaboration. That's because only they have the ability to factor into the data analysis the unique characteristics of their detector and triggering systems. Now, for the first time, a group of Fermilab physicists have made data from a high-energy physics experiment available to any scientist who wants to use it.

University of Chicago physicist Bruce Knuteson, a Fermilab researcher and former member of the DZero experiment collaboration, has developed a World-Wide-Web-based computer tool to allow physicists worldwide to search the experiment's data. With the help of DZero colleagues, Knuteson created the new tool, called Quaero (Latin for "I search"; http://quaero.fnal.gov), to provide access to data collected from 1992 to 1996 by the DZero detector during Collider Run I at Fermilab's Tevatron.

The new tool, whose description DZero has submitted for publication to the journal Physical Review Letters, enables physicists outside the DZero collaboration to perform their own computerized data searches for evidence of new physics. Without the Quaero interface, the data would be impossible to interpret by physicists outside the collaboration.

"Until now," said DZero spokesman John Womersley, "a proper analysis of our experiment's data has required a detailed understanding of the nuances and idiosyncrasies of each of thousands of components of our 5,000-ton detector. The unique characteristics and idiosyncrasies of the detector

The DZero Detector at Fermilab

Quaero takes DZero data public

DATA TO THE PEOPLE

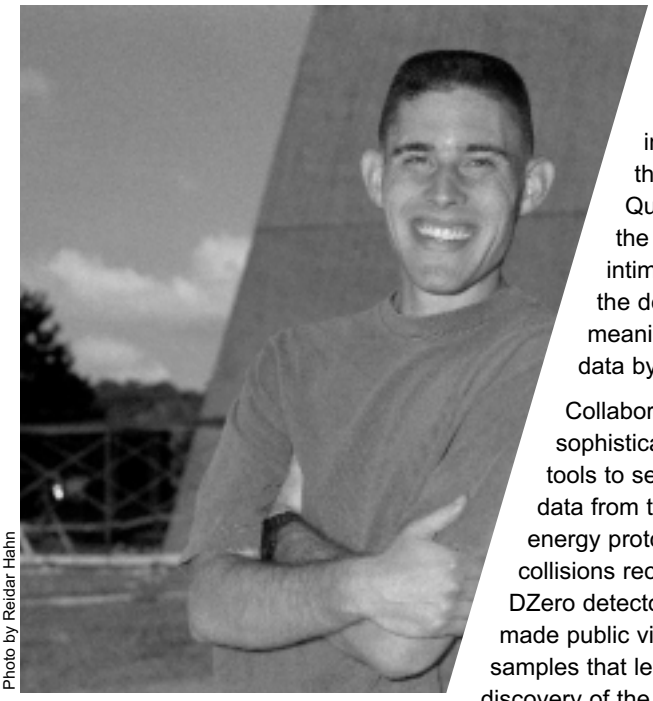


Photo by Reidar Hahn

Bruce Knuteson

influence the interpretation of the data, making it usable only to initiates within the collaboration. Quaero incorporates the experimenters' intimate knowledge of the detector, allowing meaningful use of our data by other physicists."

Collaboration scientists use sophisticated data-analysis tools to search terabytes of data from trillions of high-energy proton-antiproton collisions recorded by the DZero detector. The data made public via Quaero include samples that led to the 1995 discovery of the top quark.

Recently, astronomers have led the way in the release of "inside" data to other scientists. In June, the Sloan Digital Sky Survey announced the release of the Survey's early data to the astronomical community, along with web-based tools to make the data comprehensible. Already, said Sloan CEO John Peoples, a paper based on the data has been submitted for publication by a non-member of the collaboration.

Although Quaero does not provide access to data currently being recorded in Tevatron Run II, and it does not provide access to all of DZero's Run I data, the effort does mark the first time a high-energy collider physics collaboration has made its data available through an easy-access Web-based interface to scientists outside the experiment. Fermilab Director Michael Witherell welcomed the initiative to share the benefits of the investment in DZero beyond the collaboration's membership.

"DZero represents not only the investment of millions of dollars," Witherell said, "but also an enormous intellectual effort and thousands of person-years of hard work. We need to make the greatest possible use of this investment and of the information it gives us about the way nature works. Quaero takes a big step toward this goal."

DZero collaborator Greg Landsberg, a physicist from Brown University, said that Quaero extends the original idea behind the World Wide Web, developed in 1991 at CERN, the European Laboratory for Particle Physics, to facilitate high-speed communication among high-energy physicists around the globe.

"Quaero is an experiment to try to take this original idea one step further in making particle physics data available to scientists worldwide," Landsberg said. "If it works, it will be a big leap forward for our collaboration and for the high-energy physics community as we make the results of the tremendous investment in DZero available to all physicists."

While Quaero is designed for use by professional physicists, other efforts are underway to provide access to experiments for more general audiences. The QuarkNet program (http://quarknet.fnal.gov), for example, involves high-school students and teachers in ongoing particle physics experiments at Fermilab and CERN. The Fermilab website offers real-time views of Tevatron Run II particle collisions as they happen at the CDF and DZero detectors (http://www.fnal.gov/pub/inquiring/live_events/index.html).

Scientists at other high-energy physics laboratories have expressed interest in further applications of Quaero.

"Quaero is taking a very interesting direction," said Stanford Linear Accelerator Center Director Jonathan Dorfan. "It may well point the way for other experiments beyond DZero."

Knuteson will soon travel to CERN, the European Particle Physics Laboratory near Geneva, Switzerland, to explore the potential for adapting Quaero for use at CERN experiments.

CALENDAR

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

SEPTEMBER 15

Fermilab Art Series Presents:

Opening Night, 2001-2002 Season

Carol Wincenc, flute & Nancy Allen, harp

Saturday, September 15, 2001
$17 ($9 ages 18 and under)
Carol Wincenc Masterclass, sponsored by the Chicago Flute Club at 4 p.m

Critically acclaimed recitalists Carol Wincenc & Nancy Allen team up to present an elegant evening of music for flute and harp. All Fermilab Arts and Lecture Series programs begin at 8 p.m. in Ramsey Auditorium, in Wilson Hall. Call 630-840-ARTS; Fax 630-840-5501; email audweb@fnal.gov.

SEPTEMBER 14

One Day in September

Switz./UK/Germany (1999), 94 min., Dir: Kevin Macdonald

All shows are on Friday nights at 8 p.m. in Ramsey Auditorium, in Wilson Hall at Fermilab. Tickets are sold at the door: Adults - $4 , Children (under 12) - $1, Fermilab students - $2.

ONGOING

NALWO
Free English classes in the Users' Center for FNAL guests, visitors and their spouses. The schedule is: Monday and Friday, 9:30 a.m. - 11:00 a.m. Separate classes for both beginners and advanced students.

DANCING

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

The Fermilab Barn Dance series, featuring traditional square and contra dances in the Fermilab Village barn, presents barn dances on Sunday, Admission is $5 for adults, $2 for age 12-18, and free for under 12 years old. Contact Dave Harding (x2971, harding@fnal.gov) or Lynn Garren (x2061, garren@fnal.gov) or check the WebPages at http://www.fnal.gov/orgs/folkclub/ .

MILESTONES

HONORED

Four young Fermilab experimenters, by the DOE's Division of High Energy Physics, among award-winners in the 2001 Outstanding Junior Investigator Program: Darin Acosta of the University of Florida (CDF); Andrew Brandt of the University of Texas-Arlington (DZero); Regina Demina of Kansas State University (DZero); and Ulrich Heintz of Boston University (DZero).

RETIRING

James Edwards (ID 563) BD-AS-Mechanical Support Dept., effective August 23; last day of work August 3.

DIED

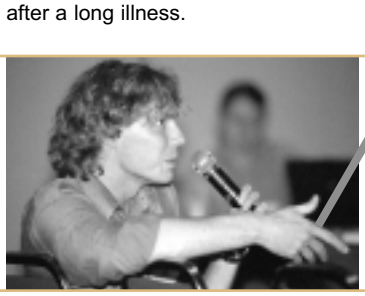
Dr. Nathan Isgur, 54, particle and nuclear theorist and chief scientist of the Thomas Jefferson National Accelerator Facility; on July 24 at his home in Williamsburg, Va. after a long illness.

INSTALLED

At 5:26 p.m., Friday July 27th; the first plane of MINOS steel; successfully erected and bolted to the bookend. It's the first of 486 such planes.

CORRECTION

In "Real World Snowmass" (*FERMINEWS* Vol. 24, No. 12, July 27, 2001), the alpine region of *Val d'Aosta* was identified as being in France. Of course, it is in Italy.



Michel Sorel

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

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

Chez Léon MENU

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CAKES FOR SPECIAL OCCASIONS
DIETARY RESTRICTIONS
CONTACT TITA, X3524
HTTP://WWW.FNAL.GOV/FAW/EVENTS/MENUS.HTML

LUNCH
WEDNESDAY, AUGUST 15

Roast Beef and Beet Salad with Yogurt Dressing
Chocolate Bourbon Pecan Pie

DINNER
THURSDAY, AUGUST 16

Eggplant Salad with Feta
Veal Saltimboca
Gnocchi with Tomato and Basil
Apricot Souffle

LUNCH
WEDNESDAY, AUGUST 22

Cold Poached Salmon with Orange Mayonnaise
Broccoli Vinaigrette
Amaretto Cheesecake

DINNER
THURSDAY, AUGUST 23

Spicy Chicken and Vegetable Bundles
Pork Sate
Jasmine Rice
Vegetable Stir Fry
Nut and Coconut Tart

FERMI NEWS

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The deadline for the Friday, August 24, 2001, issue is Tuesday, August 14, 2001. Please send classified ads and story ideas by mail to the Public Affairs Office, MS 206, Fermilab, P.O. Box 500, Batavia, IL 60510, or by e-mail to ferminews@fnal.gov. Letters from readers are welcome. Please include your name and daytime phone number.

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CLASSIFIEDS

FOR SALE

■ '00 Jeep Wrangler Jamboree Edition, convertible soft top, gold-tan color, 15K miles, 4.0L 6 cylinder engine, 5 speed manual transmission, factory oversized tires, factory double tube bumpers, factory side rocker guards, CD player and overhead sound bar. Well maintained, fully loaded and ready to go! Bought for $26K+ in 2000, current blue book is $21K+ asking $17,700 somewhat negotiable. Email Jeep4x4greg@hotmail.com or call Greg or Marion at 630-978-8478

■ '97 Suzuki Sidekick, JLX 64k, 4WD, 6cyl, man trans, tires 15k, options- A/C, rear defrost, sun roof, stereo/cassette, 10-disk CD changer, pwr windows, locks w/remote security, dual air bags, luggage rack. $8.5k o.b.o. Mike x8863, syphers@fnal.gov

■ '95 Chevy S10, 4 cyl. short bed. 59k. Air, tow pkg, liner, auto. Very good cond. $6,500. Call 815-467-7378.

■ '94 Mitsubishi 3000 GT, 84k, 6 CD changer, moon/tilt roof, AM/FM cassette, AT, A/C, metallic green, excellent condition. Asking $9,300. Call Jimmy at x3666 or 630-236-4595 or juge@fnal.gov.

■ '94 Ford Aerostar extended minivan, Eddie Bauer package, all leather, cd, all wheel drive 99k, excellent, condition $5,000 630-557-2523 x3011 Greg Lawrence.

■ '92 Mazda MX3 GS V6, 97k mi, very good cond., well maintained, clean, drives great, A/C, sunroof, one owner. $3,250 o.b.o. Call x6736 or 630-692-1701, leer@fnal.gov

■ Honda Water Pump, handles up to 3/4″ solids. 3.5HP GX-110 engine, 11,100 GPH, 2″ inlet. Includes five 50′ lengths of PVC discharge hose and 15′ suction hose with strainer. Original owner, homeowner use only. $250 markl@fnal.gov Mark, 630-840-4776 (days) 847-202-9209 (evenings).

■ Gas weed eater $35; patio umbrella $10; leaf blower/vacuum $15; cot $5; large commercial humidor, holds 100s of cigars $700. Greg Lawrence x3011 630-557-2523.

FURNITURE REFINISHING

■ Furniture refinishing and restoration. Pick-up delivery available. Call 815-695-5460

HOUSE FOR SALE

■ Convenient North Aurora 3 bedroom 1 bath, low maintenance ranch. Newer furnace and central air. Huge backyard with mature trees. 1-1/2 car attached heated garage. Extras include: Second detached 1-1/2 car garage, large utility shed, in-ground pool, huge 3-season carpeted porch with skylight & ceiling fans. Appliances included. 208 W. Arrowhead. Call 630-466-9269 for appointment.

OPEN HOUSE AT ARGONNE

Argonne National Laboratory invites you to join thousands of your friends and neighbors at its Open House on Saturday, Sept. 15, from 9:30 a.m. to 4:30 p.m. Learn about the exciting research and technology that will shape the way we live in the 21st century. Argonne Adventure 2001: Science and Technology for Today and Tomorrow will feature more than 100 exhibits staffed by professional scientists, engineers and researchers to answer your questions about Argonne's more than 200 research programs. For details see www.anl.gov/OPA/openhouse.htm.

HEAD OF MEDIA RELATIONS

The American Physical Society seeks a media relations professional to promote physics in the popular media. Based at APS Headquarters in College Park, MD this person will develop and coordinate all media relations for APS. Responsibilities include working as part of a team that identifies physics news stories, locates press contacts in the physics community, and pitches the stories to the national media. Opportunities to travel exist. The qualified applicant will have a bachelor's degree in science, and preferably additional scientific work experience (physics a plus). Considerable experience interacting with the media is necessary. Excellent oral and written communication skills are required. Competitive starting salary and outstanding benefits package offered. To apply, send cover letter including salary requirement, resume, and contact information for three professional references to Alan Chodos, APS Associate Executive Officer, by e-mail to chodos@aps.org. or to 1 Physics Ellipse, College Park, MD 20740.

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