signal to background

Ping-pong champ gets a physics roast; diving blind through crusty pipes; cup-biters of Fermilab; the strongwoman and the quark; cowed again; napkin contest; letters.

Photo: Seth Restaino

Ping-pong roast

At a recent symposium honoring former Stanford Linear Accelerator Center Director Jonathan Dorfan, dinner guests were treated to a course of the unexpected. Over the clinking of silverware, as attendees finished dessert and listened to a speech by former SLAC Communications Director Neil Calder, came the incongruous *click clack, click clack* of a ping-pong game in progress.

Curtains parted to reveal a ping-pong table and former Olympians Khoa Nguyen and Whitney Ping hard at work demonstrating what Calder called "the fundamental structure of Dorfan's personality:" his ability to make quick decisions and think on his feet; his iron will and timely attack; his tremendous tenacity and stamina throughout long rallies; his impenetrable defense against constant attack; and his integrity and sense of fair play.

While Calder expounded on Dorfan's qualities, diners gasped and chuckled as ping-pong balls zipped through the air, only occasionally missing their mark and just once flying into the audience and bouncing off a dinner table.

Earlier in the day, in the first speech of the *Let's Celebrate Jonathan* symposium, David Dorfan had proclaimed his brother to be "unroastable." This proved to be very much the case. Although Calder tried his best to lampoon his former boss for his "really very enormous" ears, "grotesquely large" teeth, and "small, squinty" eyes, each of these criticisms soon revealed itself as hidden praise. Dorfan's large ears, Calder said, only emphasize his willingness to listen; his big teeth only draw attention to his friendly demeanor and ever-present smile; and his small "but beautifully formed" eyes only enhance the extraordinary vision of this one-time South African Youth Table Tennis Champion.

Kelen Tuttle

Photo: Reidar Hahn, Fermilab

Diving for zebras

Ben Czaplewski lifts a 30-pound helmet onto his head and lowers himself into a manhole. He disappears without a splash.

Water is the lifeblood of Fermilab's Tevatron, the world's highest-energy particle accelerator. Its intake pipes suck 5000 gallons of water a minute into the accelerator rings, cooling superconducting magnets that direct beams of proton and antiproton particles hot enough to melt metal.

But that flow has slowed, blocked by invasive zebra mussels that build up like plaque in the arteries of a heart. Now, armed with hoses, scrapers, and chemicals, Czaplewski must root them out.

The cloudy pond water leaves Czaplewski working blind, pulling himself through intake pipes three feet in diameter, 75 feet long, and lined with zebra mussels.

"Your only eyes are these," he says, fanning out his gloved fingers. Like a surgeon using a camera scope to find a blocked artery, he relies on his land crew to guide him with engineering blueprints and a two-way radio.

Czaplewski works for Lindahl Marine, which sends a crew of divers four or five times a year to clear out the pipes. The crew is accustomed to diving in places with limited to no visibility: steel mills, oil refineries, nuclear power plants, and sewage treatment plants. Still, a physics lab counts as unusual.

Diver Nate Lesley remembers a field trip to Fermilab as a schoolchild. "I definitely never imagined I'd be diving here," he says.

Suddenly loud static crackles from the radio, followed by several thumps. With a splash of water, a hand reaches out of the access hole, clutching an injection line that is supposed to trickle a mussel-killing chemical into the pond. It is broken and caked with zebra mussels; now it will be replaced.

Stage one of the operation is complete.

Jennifer Lee Johnson

Chomp a cup for science

When you walk into a bar you expect to see whiskey bottles and beer taps, not stacks of tooth-imprinted foam cups.

Yet at the Fermilab Users' Center, the cups hold a place of honor behind the bar. They serve as a conversation piece and as evidence of the varied ethnic backgrounds of people who come to the Illinois lab from dozens of nations.

"One time we were at the bar, solving the problems of the world, and the conversation came up who was Native American and who wasn't," said Ernie Villegas, a mechanical engineer at Fermilab.

True to their scientific roots, the group put the question to a test: They asked people to bite the foam lips of disposable cups.

The results reveal a pattern dubbed "shovel tooth" or "spade tooth," in which the backs of the incisors have a cupped, shovel shape and leave a U-shaped mark.

This pattern, called Sinodonty, appears only in those with northern Asian or Native American ancestry. It was first described by anthropologist Christy Turner of Arizona State University. He said the distribution of the trait suggests that people from northern China migrated to Mongolia and then across the Bering Strait to North America about 14,000 years ago.

Fermilab's René Padilla was surprised when the trait showed up in his family. Some theorize that Native Americans carried the trait to Latin America; Padilla assumes this is how his Puerto Rican ancestors picked it up.

At last count, people at Fermilab had collected 16 bite patterns showing the trait. They would love to find more samples, especially from other laboratories.

"You would be surprised. A lot of people that you wouldn't think have it, will. There are so many mixtures of blood that people don't really know what they are," says Villegas, who is half Apache. He brought the cup test to Fermilab two years ago after learning about shovel tooth on a vacation to the Dakotas.

"I wouldn't say that it's a study, really," he says, "but it's an interesting thing to do."

Tona Kunz

Jennifer Gimmell tows a a 23,000 pound truck to

Photo courtesy of Jennifer Gimmell

Powerlifting physicist pulls 11-ton truck

Jennifer Gimmell's coworkers didn't believe she competitively pumped iron. But as the evidence piled up—including a photo of her pulling a 23,000-pound truck—her fellow physicists had to concede: The strong force had nothing on Gimmell.

"They'll ask me the kinds of numbers that I have for my lifts," she says," and that's when it starts to hit them that I'm not just making this stuff up."

The University of Rochester graduate student works at CDF, the Collider Detector at Fermilab. She squats 360 pounds, bench presses 200 pounds, and deadlifts 320 pounds.

The 5-foot-7-inch athlete is often dwarfed by other competitors, but that didn't stop her from taking first place in the Align Life Strongman competition last fall and second place in the American Powerlifting Federation's Chicago Summer Bash 5 in June.

Gimmell played softball and rugby in school, but never considered powerlifting until 2006, when fellow physicist Dan McCarron invited her to lift weights in the Fermilab gym.

"We started training together, and I realized I was able to do heavier weights than other people and make quicker strength gains," Gimmell says.

The grueling three-hour workouts help balance the mental workout of studying the heaviest subatomic particle, the top quark, at CDF.

"It's a huge stress relief. I'm physically exhausted, so I can fall asleep at night without my mind speeding around work remaining in my thesis," Gimmell says. She adds that if you ask around, you'll probably find a lot of physicists bicycle or run marathons for the same reason.

Jennifer Lee Johnson

Weird new hazard: snoopy, itchy cows

In the control room in Argentina, the detector screen went blank.

"We've been cowed again," announced an exasperated scientist.

When the Pierre Auger collaboration installed 1600 particle detectors across a large swath of desert near Malargüe, Argentina, it planned for the climate: sand, salt, freezing rain.

But it didn't consider livestock.

"Cows have two properties: They are very curious and won't leave anything alone, and they like to scratch themselves," says Paul Mantsch, the project manager, and, fortunately, a farm boy. "If they find a sharp edge, they go crazy scratching."

Each detector consists of a water tank, solar panels, and a battery storage box. By capturing particles produced when cosmic rays hit the atmosphere, scientists hope to discover where the highest-energy rays come from and whether all galaxies have black holes at their centers.

Only a handful of detectors had been produced and installed when the problems began. To a cow that couldn't find a tree for miles, the battery storage boxes looked very inviting.

"They kept scratching themselves on them and pushing the boxes around until they disconnected," Mantsch says.

The team immediately switched designs: From that point on, the boxes had rounded corners. "We haven't been cowed since," he says. "It's been almost five years now."

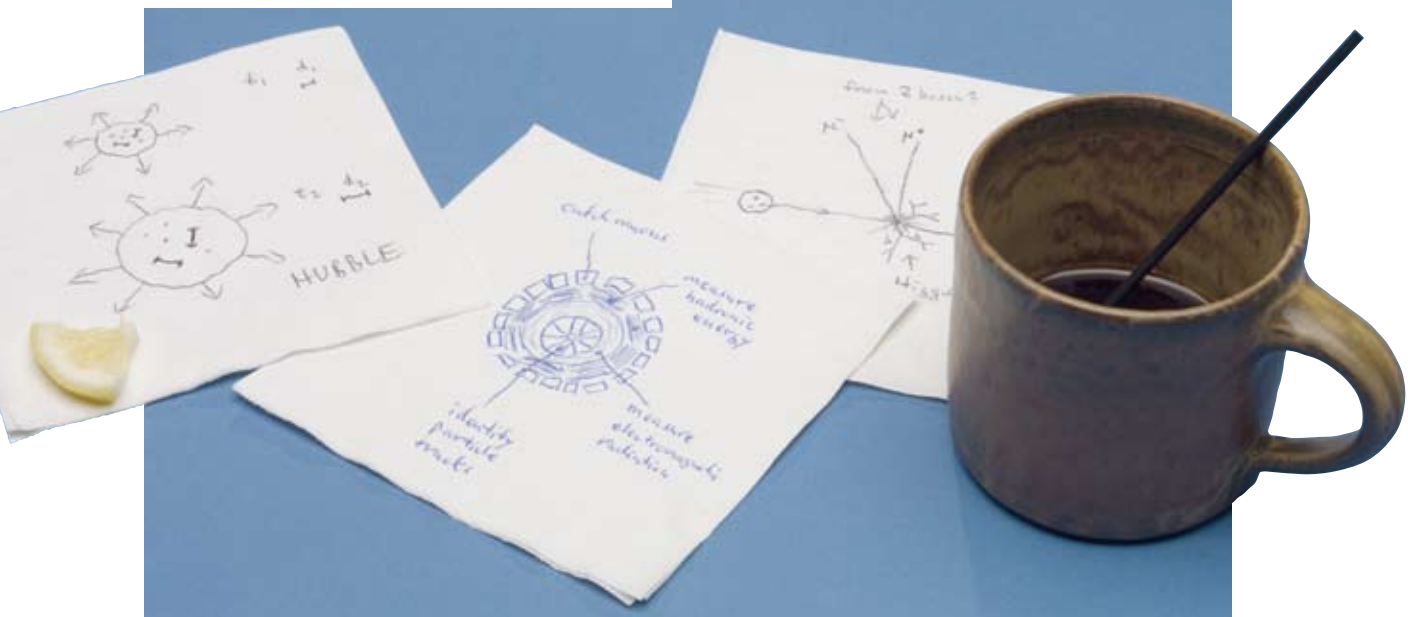
The installation was completed in June. A second set of detectors being built for an array in Colorado will also be cow-proof.

The team shrugs off the cow conundrum as just part of doing science. "We confront all kinds of hazards doing science, but that is the exciting part," Mantsch says. "When you see your results on the cover of *Science* [in fall 2007], it's worth it."

Tona Kunz

Photo courtesy of Pierre Auger Collaboration

contest



The *symmetry* challenge: Physics on a napkin

We've all heard the stories of great ideas first scribbled down in a bar on any convenient surface, often a cocktail napkin. We've also heard many cases of colleagues in bars asked to describe just what it is they do. Lacking a whiteboard or chalkboard to draw on, the cocktail napkin comes to the rescue again.

So here's the challenge: Describe your own physics research in 60 seconds, along with a photo, scan, or the original of a cocktail napkin with whatever scrawlings help tell your story. The explanation can be in the form of a 60-second audio or video file or up to 200 words of text.

We'll send a prize to the clearest, most entertaining napkin and explanation, and show a selection of the best in *symmetry*.

Photo: Reidar Hahn, Fermilab
Drawings: Kurt Riesselmann, Fermilab

letters

Introducing kids to science

I am a home-educating father of six living in Iowa, but I grew up in the Chicagoland area. As a young adult I was introduced to Fermilab through the late Dr. Sam Segler. At the time I couldn't care less about the science, since I really didn't understand it, but I loved the wonderful architecture.

Shortly after moving to Iowa I added myself to the *FermiNews* mailing list and found myself learning more about the work going on at the lab. Now I find myself teaching science not only to my kids, but also to a group of about 80 every Friday.

Our children nationwide are hungry for science, but I think we may be failing them because we figure that 7-year-olds can't understand physics, so we dumb it down. I'm here to tell you that is dead wrong. At one point I introduced the concept of gravitational lensing to 6- to 8-year-olds, and they do get it.

Might I share four things that I believe will help kids better understand science early?

1) Teach them the language of science, so they can understand what the media are saying about it.

2) Forget running facts down their throats. Kids don't care how many TeVs Fermilab sees. If they are hungry they will seek out people who can help them dig deeper, i.e. the Lederman Science Center and its docents.

3) More science, earlier in their schooling, for more years. Why are we surprised students are so science illiterate when we don't really start teaching it until the last four years of school?

4) Let's make science fun, not work! Trust me, I'm not alone. Just take a look at the last issue of *symmetry*; Jerry "Mr. Freeze" Zimmerman will back me up.

Maybe everyone at Fermilab, and at SLAC for that matter, should take a day off and go to school, look a kid in the eye, and see if they can plant the same seed in that kid that someone planted in them years ago.

Keep up the great science! We all need it.

Jeff Hauser, Lohrville, Iowa