



## Volunteers Extraordinaire

*With this article we begin a new series that will showcase the Fermilab staff members who volunteer for Education Office activities. Although one volunteer is honored each year with the Director's Volunteer Award, there are many more who contribute significant time and effort to educational outreach at the lab.*

*We begin the series with David Schmitz and Michael Cooke, recipients of the 2011 and 2010 Director's Volunteer Awards.*

"Fun and exhausting."

That's how David Schmitz and Michael Cooke describe their volunteer work bringing science to kids.

Dave and Mike, both physicists at Fermilab, are seasoned veterans in the Physics Classroom Presentation program offered through the Education Office and aimed at students in grades 2-12.

Dave's involvement in the program began when he chose *Force and Motion* from a list of available demo kits. Why *Force and Motion*? "Because it had big, fun objects like bowling balls that kids like to interact with," he remembers.

Mike chose *Charge! Electricity and Magnetism* because "who wouldn't want to play with a Van de Graaf?"

He searched online and found some Java demos from the University of Colorado to include in his presentation [see them at <http://phet.colorado.edu>] "and now a whole class can help come up with a good experiment.

"Kids vote on what they think the outcome will be and by the end they usually vote for the right thing. So it clearly helps them to learn."

For a few years Mike and Dave separately honed their presentation skills, visiting Chicago-area classrooms and enjoying the engagement with students. Then, two and a half years ago, they were asked to team up and create a hybrid of the two demos for presentation at Fermilab's Open House.

Dubbed *FUNDamental Physics*, the new presentation features highlights

of the *Force and Motion* and *Charge! Electricity and Magnetism* presentations and includes new material as well.

"We said to ourselves, 'Let's get the biggest, flashiest things we can and

things, it would be hard to keep kids engaged."

"There are big crowds of all ages at Open House," notes Mike, "so we try to make the demos relevant to all audiences.

We want to make it interesting for elementary school kids and let them learn something new, while also enticing high school groups with a little more detail about something they might be studying. We spend a lot of time working on that—it's really difficult to pull off."

Susan Dahl is delighted with the high-energy team. "Whether you're a student, parent or scientist, you leave a show that Dave and Mike do with enhanced excitement about science. You feel their love for it and it's contagious."

"It's also unusual," she adds, "for scientists still early in their careers to devote this much time to science education. They're putting so much of themselves into it at a time that is critical in their careers."

The pair's knack for getting kids excited about science made them the perfect choice to perform a cryogenics demonstration in Chicago's Millennium Park during the final event of Science Chicago's LabFest!, a 2009 summer-long city-wide celebration of science.

The pair did a 20-minute show demonstrating the effects of liquid nitrogen on various objects. They inflated plastic bags with boiling nitrogen and drove a nail into wood using a frozen banana.

For a grand finale, they poured liq-



Physicists Michael Cooke and David Schmitz take the stage at Science Chicago's LabFest! in 2009 to demonstrate the effects of liquid nitrogen.

make a demo out of that," recalls Mike. "Then we'll relate it to science at Fermilab and touch on some more advanced concepts for high school students."

FUNDamental Physics has been a big hit, and for the past couple of years the pair has done multiple shows at both the Fermilab Open House and Daughters and Sons to Work day.

"The demos are key," comments Dave. "The kids tend to be eager and excited and there's always a large number of hands to choose from. The possibility that they might get called on next is very exciting to them.

"After the show there are long lines of kids who want to try the demos. If we just stood up and talked about

## Education Office staff attend ISEC

On October 28, 2011, Fermilab Education Office staff participated in the Illinois Science Education Conference, sponsored by ISTA and held at Tinley Park Conference Center.

The staff offered handouts, “goodies” and demonstrations at their booth, and presented mini-talks about dark matter, neutrinos and accelerators.

Fermilab staff contributed two talks during breakout sessions: docent Mary Jo Murphy offered a presentation on schoolyard habitats, and Spencer Pasero presented a session on the Summer Institutes for Science teachers offered each summer by the Education Office.

The 2012 conference is scheduled for November 1-3 at the Crowne Plaza Hotel in Springfield, Illinois.

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uid nitrogen into a bottle, screwed it closed, dropped it into a 3-foot metal tube, added a ball, and aimed at the sky. The bottle dramatically exploded, rocketing the ball hundreds of feet into the air.

Dave recalls packs of kids hovering in the front row, waiting for the explosion. “As soon as the canon went off all these kids leaped up to chase the ball—which landed pretty far away.

“It’s why I like working with kids—they get so excited. At that age, we’re not asking that they walk away with a firm understanding of science principles. That would be a lot to ask.

“We just want them to leave with the idea, ‘That was science and science is fun.’ We want them to go home with a fond memory and a connection between science and having a good time. More often than not, we seem to achieve that.”

Dave and Mike also volunteer their time to speak with middle school,

high school and college groups that visit Fermilab.

“You always get some kids who are interested and enthusiastic,” says Mike, “so that keeps me coming back. When I do a Q&A with students I try to emphasize how much there is still to learn, how little we really know.

“We know a lot, but there’s so much more to learn, even about our questions. It’s easy to ask something that we don’t know the answer to.”

He remembers himself visiting the Baltimore Science Center at a young age.

“I could go to a science show, play with a Van de Graaf—I found those things very cool. They influenced me greatly in deciding to be a scientist. Now I’m doing my part to continue that with the next generation. I want to show kids that there are more possibilities than they’ll find in a textbook or classroom.”

An encounter with a “real scien-

tist” can have a significant effect on young students, the two have learned.

Mike recalls an experience with a middle school group: “I was ready to leave—we had already done the Q&A.

“Then one kid said ‘We’ve met a real scientist! Can we get your autograph?’ Next thing you know, a dozen kids were asking for it. The funny thing is, I wasn’t even sure it was going well—it was one of the more guarded groups at first. But they were really enthusiastic by the end.”

Generating that excitement about science is what keeps Dave and Mike putting up with the exhaustion and coming back for more.

*To see Dave and Mike in action at LabFest!, go to <http://www.youtube.com/watch?v=Q2AZElosLpo>.*

*For more on Fermilab’s Classroom Physics Presentations, visit [http://ed.fnal.gov/trc\\_new/demos/](http://ed.fnal.gov/trc_new/demos/).*

## 2012 Events—Mark Your Calendar!

- **WONDERS OF SCIENCE** **Sunday, February 26, 1-2:30 p.m.**  
*<http://ed.fnal.gov/events/wos/>*
- **STEM CAREER EXPO** **Wednesday, April 11, 5:30-8:30 p.m.**  
*<http://ed.fnal.gov/programs/careerfair/>*
- **FERMILAB FAMILY OPEN HOUSE** **Sunday, April 22, 1-5 p.m.**  
*<http://ed.fnal.gov/ffse/openhouse/>*
- **FERMILAB FAMILY OUTDOOR FAIR** **Sunday, June 10**  
*<http://ed.fnal.gov/events/outdoor-fair/>*

Would you like to volunteer at any of these events? Have questions?  
Send e-mail to Gayle Millman at [millman@fnal.gov](mailto:millman@fnal.gov).

## Save the Date: Our Third "Members Only" Tour



FFSE members and guests enjoy the Main Ring prairie during the second "Members Only" tour last September.

FFSE members and their guests are invited to the third FFSE "Member's Only" tour of Fermilab. The topic of this tour will be Fermilab history, art and architecture.

Adrienne Kolb, Fermilab archivist and co-author (with Lillian Hoddeson and Catherine Westfall) of the book *Fermilab: Physics, the Frontier, and Megascience* (The University of Chicago Press, 2008), will discuss Robert Wilson's vision for the laboratory and the changes that have ensued over the years. A docent-led tour of laboratory grounds and buildings will follow the talk.

Watch your mail for a postcard announcing the date!

## For Outstanding High School Science Students

FFSE offers annual awards to outstanding students attending high schools in DuPage or Kane County. Information about the award is sent each year to the department chairs at eligible high schools. Awardees receive a certificate and a book at their school's award ceremony.

Teachers who want to recommend a student for this award should contact the science department chair at their school.

Please let your colleagues know about this opportunity.

### Program Scholarships

Each year FFSE sponsors scholarships for students who need financial help to attend Science Adventure enrichment classes.

FFSE also sponsors scholarships for teacher workshops and field trip bus scholarships for schools that seek to bring students on field trips.

For more information, visit our website:

<http://ed.fnal.gov/ffse>

### Proxies Needed!

The FFSE annual meeting is scheduled for Tuesday, May 15.

**Watch your mail for the FFSE ballot, which will allow you to vote on board members for the coming year.**

Please remember to return this proxy! It is very important to us. The mailing will include information about the annual meeting program. All members are welcome to attend.

FFSE members are partners with Fermilab in support of K-12 education.

As a not-for-profit organization FFSE underwrites:

- Teacher scholarships
- High school student awards
- Family Science Adventure scholarships
- Field trip transportation assistance scholarships
- Annual Fermilab Family Open House
- Van to transport scientists and equipment for classroom presentations
- Programs in need of special funding arrangements

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## Membership Form

Annual Dues: Director's Club..... \$1,000  
Patron..... \$500  
Sponsor..... \$250  
Dual..... \$100  
Regular..... \$50  
Joint FFSE/ISTA membership..... \$39  
Teacher..... \$10

*Please check the appropriate membership category and enclose your check made out to **Fermilab Friends for Science Education**. Include matching funds from your company, if applicable.*

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## Fermilab Friends for Science Education

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