

FERMILAB FRIENDS *for* SCIENCE EDUCATION



annual report 2009

**FERMILAB FRIENDS FOR
SCIENCE EDUCATION**

ANNUAL REPORT

2009



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FROM THE FERMILAB DIRECTOR

May 6, 2010

Dear Fermilab Friends for Science Education:



*Piermaria Oddone, Director
Fermi National Accelerator Laboratory*

Thanks to your efforts, Fermilab has been able to create a remarkable K-12 science education program that has a lasting and positive impact in our neighboring communities and beyond. Without your support we could have never achieved the breadth and excellence that are the hallmarks of our program. It has been a model for other institutions and for our sponsoring agency, the U.S. Department of Energy. Over the last decade we have reached hundreds of thousands of students and tens of thousands of teachers—a fantastic record that benefits the nation.

Federal funding for education programs at institutions like ours has varied greatly across the years. It has been the constancy of the support for Fermilab Friends for Science Education that has anchored our science education program and has permitted us to design creative new ways to engage our youth in scientific inquiry. The new administration in Washington has been passionate about the need for science education and investments in science generally. President Obama speaks eloquently about the important role of science and science education to the future of our country. We hope this leads to new and even more extraordinary science education initiatives at Fermilab. The support of Fermilab Friends for Science Education will be more important than ever in seeding these initiatives so that the next generation of young scientists may flourish.

Sincerely,

A handwritten signature in black ink that reads "Piermaria Oddone". The signature is written in a cursive style and is underlined with a single horizontal line.



FROM THE FFSE PRESIDENT

May 12, 2010

Dear Friends,

2009 was a busy year for programs thanks to your support. Our report shares several highlights for you to peruse.

Fermilab Friends for Science Education made it possible for the Education Office to represent Fermilab as a major partner in the Science Chicago yearlong celebration of science throughout the Chicagoland area. Docents, scientists, engineers and staff took the FFSE van full of science equipment to engage students with balls, ramps and bike wheels. What fun we had and how rewarding it was to look into the faces of young and old alike to see their enjoyment and excitement as they learned physics in a new way! It was a very special summer.

Board members hosted summer program snack times in each of the teacher workshops and institutes last summer. This helped communicate our appreciation for the teacher's interest in learning through our programs and the benefits FFSE membership provides. We look forward to seeing more new members as we host snack time again this summer.

2009 marks the ten-year anniversary of QuarkNet. QuarkNet has broken new ground in engaging high school students with physics data. The collaboration of high school students, teachers and scientists has expanded their reach to an international level. Presently 22 foreign institutions have engaged with the QuarkNet cosmic ray muon detectors. Read about teachers who have been with the project for ten years, and see the resources and potential of QuarkNet by connecting to the "Project Overview" at <http://quarknet.fnal.gov/index.html>. FFSE has played a part in supporting QuarkNet. Congratulations on ten years.

As I write this letter, the Education Office just concluded participation in President Obama's initiative, National Lab Day. Fermilab's efforts during the week of May 3-7 brought scientists, engineers and other technical staff into science classrooms with engaging hands-on science demonstrations. (See: <http://www.fnal.gov/pub/NLD/>) With increased emphasis on science and science education coming from our President, we look forward to 2010 as a year of enriching experiences for families, students, teachers and the scientists, engineers and staff that support them. Your membership and role in Fermilab Friends for Science Education will help make the year to come successful.

Thank you to our members and donors for your support in 2009.



*Susan M. Dahl, President
Fermilab Friends for Science Education*



PROGRAMS IN 2009

SCIENCE CHICAGO LABFEST



Physicist Michael Cooke encourages a LabFest participant to beat the gravity accelerator.

Fermilab was a year-long participant in Science Chicago's LabFest, a series of free events in the Chicago area designed to stimulate public interest in science.

The outdoor events attracted thousands of spectators to various Chicago public schools, parks and libraries. Fermilab joined museums, laboratories, universities, and scientific societies in providing activities during the year-long celebration.

At Fermilab booths, young participants raced balls on a "gravity accelerator," collided balls on a "gravity collider," rotated wheels to feel angular momentum, and launched skateboards to experiment with gravity. Fermilab staffers fielded questions about physics and the laboratory and distributed information about Fermilab's education programs.

At LabFest's grand finale in Millennium Park, neutrino physicist **David Schmitz** and DZero physicist **Michael Cooke** demonstrated the peculiar effects of liquid nitrogen. Their performance drew giggles and cheers from a crowd of nearly 8,000 spectators.

Fermilab's LabFest volunteers included staff members **Penelope Constanta, Michael Cooke, Lynn Garren, David Harding, Anne Heavey, Amber Johnson, Michael McGee, Thomas Meyer, Jennifer Pursley, David Schmitz, Diego Tonelli** and **Jim Zagel**. They were assisted by Education Office staffers **Susan Dahl, Spencer Pasero** and **Sue Sheehan**, and docents **Lynda Ballingall, Sue Dumford, Maureen Hix, Dee Huie, Dawn Miller, Mary Jo Murphy, Mary Ann Stowell, Felicia Svoboda** and **Anne Mary Teichert** who worked booths at sites from Lincolnshire to Joliet.

FERMILAB FAMILY OPEN HOUSE

On a freezing day in January, FFSE's Fermilab Family Open House drew an impressive 3,500 people to Wilson Hall.

Crowds of children eagerly explored hands-on activities scattered throughout the atrium and art gallery areas, and expressed delight at wonders such as a levitating train, a walnut-smashing ball bearing accelerator, and a shocking Van de Graaff generator.

Crowds filled the auditorium repeatedly to laugh in surprise at **Jerry Zimmerman's** inimitable cryogenics show.

Although the primary purpose of the day was to invite children to enjoy science, older visitors found plenty of stimulation as well.

Docents led tours of the Linac and the LHC Remote Operations Center, and physicists welcomed guests to the 15th floor of Wilson Hall, patiently answering questions from the arcane to the basic, "What do you do here?"



Physicist Erik Ramberg explains the Meson Detector Test Facility to visitors at the 2009 Open House.

PROGRAMS IN 2009

SYMPOSIUM ON THE NATURE OF SCIENCE

Fermilab's Education Office presented the seventh Symposium on the Nature of Science on October 7, underwritten by the generosity of an anonymous donor. Nearly 300 students from local high schools visited Fermilab to hear talks by scientists working at the cutting edge of research.

Fermilab Director **Pier Oddone** opened the 2009 Symposium with a welcoming talk describing his education and career and explaining the value of society's investment in science.

Nolan Flynn (Wellesley College) followed Oddone, speaking on *Biomaterials: Making the Bionic Human*. **Holly Goodson** (University of Notre Dame) finished the morning's program with a talk on *Molecular Engines and Nano-Train-Tracks*.

After a box lunch in the cafeteria, students heard from two more speakers: **Geza Gyuk** (Adler Planetarium and University of Chicago), describing *Telescopes from Galileo to VERITAS*, and **David Saltzberg** (UCLA) relating his adventures while *Neutrino Hunting Using High-Altitude Balloons in Antarctica*.

The aim of the annual symposium is to increase students' interest in science and to expose them to the connections between various scientific disciplines.



Dr. David Saltzberg from UCLA describes research in Antarctica for the Symposium on the Nature of Science.

FAMILY OUTDOOR ACTIVITY FAIR



Families learn about raptors as a hawk eyes them warily.

The 2009 Family Outdoor Activity Fair attracted over 300 visitors despite wet and windy weather on April 26.

The drizzle subsided just as families arrived, allowing them to visit stations set up on the lawn surrounding the Lederman Science Center.

Children grabbed nets and swept the pond looking for aquatic critters, while families set off on nature scavenger hunts in the prairie and woods.

Young runners raced down a path to see if they could sprint faster than a bison, then caught their breath as they stood beside a life-sized painting to compare their height to a calf's. Those who wanted to see the real thing could drive to the bison field where a docent explained the herd's habits and passed around horns and fur.

Members of the Northern Illinois Raptor Rehab and Education group attended the fair for a second year and manned a table beside the Lederman Center, displaying magnificent birds that they had trained or rehabilitated and explaining about raptors' biology and habits.

Throughout the afternoon, docents and volunteers assisted visitors and answered questions about the prairie and Fermilab.

CONGRATULATIONS TO HONOREES!

DIRECTOR'S AWARD

In 2009, FFSE once again sponsored a reception and Director's Award to honor the more than 200 members of the Fermilab community who contributed their time and talents to Fermilab's education programs.

The award of \$1,000, made possible by an anonymous donor, recognizes one volunteer whose contributions are exceptional, even among the many outstanding volunteer supporters of Fermilab's K-12 education programs.

Nominees **Roger Dixon** (Saturday Morning Physics and Internships for Physics Majors), **Don Lincoln** (many public education activities, including work with QuarkNet teachers), and **Todd Johnson** (demonstrations of electromagnetism, including a demonstration at the 2009 Open House) received certificates of appreciation for their contributions. Finalists **Erik Ramberg**

(Saturday Morning Physics and Fermilab's solar and wind energy display) and **Michael Cooke** (secondary school lectures, contributions to the Science Open House events and presentations at the Science Chicago LabFests) also received certificates of recognition for their work.

The 2009 award went to **Suzanne Weber**. Her citation read: "Fermi National Accelerator Laboratory recognizes the exceptional contributions of Suzanne Weber to the Saturday Morning Physics program over 20 years. Her support has been integral to Saturday Morning Physics, which has influenced the lives of thousands of high school physics students, some of whom have returned to work at the Lab. Her long-term support and dedication to this program has enhanced the laboratory's reputation in both education and science research."

FERMILAB SCIENCE AWARD FOR HIGH SCHOOL STUDENTS

Every year FFSE underwrites an award program for outstanding science students attending high schools in DuPage and Kane Counties. Nominated by school faculty, each winner receives a certificate and a book at their school's award ceremony. This year's winners were:

Tom Sobyra, Magda Naziemiec, Addison Trail High School; **Laura Saunders, Gabrielle Galloway**, Aurora Central Catholic High School; **Claire Geyer, Katherine McConachie**, Benet Academy; **Meghan Thommes, Peter Cappas**, Burlington Central High School; **Muhammad Saifulah, Saba Nawazish**, College Preparatory School of America; **Mathew Thomas, Douglas Mateas**, Community High School; **Kyle Kleyweg, Steve Le Blanc**, Downers Grove South High School; **Grace Gerhard, Yesenia Melendez**, East Aurora High School; **Jake Tauscher**, Geneva High School; **Kelly Durante**, Glenbard North High School; **Shenling Hu, Amanda Walborn**, Glenbard South High School; **Adin Lykken, Sonja**

Bromann, Glenbard West High School; **Alex Kim, Jessica Noglows**, Hinsdale Central High School; **Seth Pree, Adam Leemans**, Illinois Mathematics and Science Academy; **Megan Barnish, Sean Doherty**, Immaculate Conception High School; **Ahmed Mansour, Waheed Moeed**, Islamic Foundation School; **Matt Lind, Michael Skalnik**, Larkin High School; **Brian Gallagher, Peter Mouche**, Naperville Central High School; **David Kravis, Li Pan**, Naperville North High School; **Tanay Ganga, Nivedita Umasanker**, Neuqua Valley High School; **Jacqueline Simon, Erin Anderson**, Rosary High School; **Derek Broadhead, Sarah Johnson**, St. Charles East High School; **Kelsey True, Gregg Trusso**, St. Charles North High School; **Kyle Healy, Grant Conner**, St. Francis High School; **Kristina Falk, Gilberto Chaidez**, West Aurora High School; **Joshua D. Ellis**, Wheaton Academy; **Paul Storm, Rebecca Pindel**, Wheaton North High School; **Ryan O'Malley, Zachary Zboncak**, Wheaton Warrenville South High School; **Jonathan Koch, Megan Becvarik**, York Community High School.

FRANKLIN AWARD AND SCHOLARSHIP

In 2009, FFSE once again partnered with the Franklin Fund to offer a \$1,000 scholarship for one college-bound student in each of Kane and DuPage Counties.

The scholarship is an effort to encourage and support student interest in science and to recognize outstanding achievement. Any senior in Kane or DuPage County who has been honored with the Fermilab Science Award is eligible. Selection criteria include grades; participation in activities such as science clubs, academic competitions or talent searches; original work, and

internships.

In 2009, there were seven finalists from Kane County high schools. **Elizabeth Runge** from Rosary High School in Aurora received the medallion and award from Paul DesCoteaux of the Franklin Fund at her school's honors assembly on May 20.

There were three finalists from DuPage County high schools. **Kelly Durante** of Glenbard North High School received the award from Susan Dahl at her school's honors assembly on May 13.

DISTINGUISHED EDUCATOR AWARD

Sandy Katula of Columbia Central School in Steger was this year's recipient of the Distinguished Educator Award, funded by FFSE. The award is for educators who engage students in science, provide leadership for the profession and are associated with Fermilab's K-12 education programs.

Katula received the award for, "Her exemplary approach to teaching science through a conceptual, hands-on and student-

centered approach." Her citation noted that, "Through participation in a classroom-centered program, Beauty & Charm, and a teacher professional development program, Summer Science Institutes, Sandy has increased her content knowledge and teaching strategies. As a leader, Sandy listens to her colleagues and helps make decisions based on student needs. She is always striving to be the best teacher she can be."

SCHOLARSHIP WINNERS

In 2009, seven teachers received FFSE-funded scholarships that allowed them to attend workshops or field trips at Fermilab, and one family received a Science Adventure scholarship.

The recipients were: **Anna Durso**: \$275.00 toward The Prairie—Our Heartland (\$175) and field trip bus (\$100); **David and Kathryn Gans**: \$100.00 toward Family Science Adventures; **Alisa McIntosh**: \$112.50 toward Particles and Prairies field trip;

Stacey Nunley: \$400.00 toward Physics Institute: Mechanics; **Alice Faye**: \$400.00 toward Chemistry Institute: Introductory Topics; **Patti Smykal**: \$200.00 toward Chemistry Institute: Advanced Topics; **Marlene Steimel**: \$400.00 toward Waves, Sound & Optics; **Amanda Wagner**: \$200.00 toward Physics Institute: Mechanics.

PROGRAM HIGHLIGHTS

January

The 5th annual Family Open House, sponsored by FFSE, drew a record 3,500 visitors. The afternoon's offerings included hands-on exhibits, tours, demonstrations, Ask-a-Scientist, cryogenic shows and "make and takes."

February

Fermilab presented the first of four sessions of a Particles and Prairies workshop for Kane County science teachers offered at the request of the Kane County Regional Office of Education.

The Education Office offered four sessions at the DuPage County Science Institute Day at Fenton High School in Bensenville, each highlighting one of our summer workshops: the Summer Secondary Biology, Physics and Chemistry Institutes, and Beauty and Charm.

March

Parents of young children participated in the second SPARKS science workshop at Fermilab, aimed at enabling them to become effective science advocates for their children. Participants explored physical and life science topics and activities to try with their children.

Weird Science presented the 22nd annual Wonders of Science show in Ramsey Auditorium to an audience of more than 800 people.

April

About 300 visitors attended the Family Outdoor Activity Fair. At stations set around the Lederman Science Center, families experienced nature by netting aquatic creatures, walking the prairie and learning about birds of prey.

About 500 students and parents from Kane and DuPage County schools came to Fermilab for a Science, Technology, Engineering, and Mathematics (STEM) career fair. Attendees learned more about STEM careers from working professionals in a wide variety of fields.

May

Science Chicago began the year's neighborhood LabFests. Between May and August, the Education Office's traveling hands-on exhibits represented Fermilab at 16 venues. Approximately 29,400 students engaged in science activities as part of LabFest.

During 2009, 1,798 middle school students from 28 schools participated in Beauty and Charm and Friendly Physics field trips through the Lederman Science Center.

June

Summer Secondary Science Institutes in Biology, Chemistry and Physics drew 65 teachers.

Twenty-eight teachers attended The Prairie—Our Heartland, Particles and Prairies, Friendly Physics, and Beauty and Charm workshops over the summer.

July

During 2009, science adventures engaged 616 children in grades K-10 in a wide variety of activities. Some of the 38 classes offered included Energize Your World, Lego Engineering, Survival Science, The Bugs Are Back!, Dinosaur Hunt, and Peering into the Night Sky: A Family Adventure.

August

More than 1,000 Scouts from 79 troops earned science-related badges at the LSC during 2009.

More than 3,000 drop-in visitors explored the hands-on exhibits at the Lederman Science Center during 2009.

September

During fall, 6,829 students from 54 schools attended The Prairie—Our Heartland and Particles and Prairies field trips.

A new Insects at Work in Our World field trip debuted with 1 school and 62 students participating.

The Fermilab Junior Prairie Rangers program entered into its second year. Rangers earn certificates and pins for performing stewardship activities related to the prairie.

The Education Office hosted an ENTICE Illinois Department of Natural Resources workshop on spiders for 18 participants.

October

About 300 high school students attended the seventh Symposium on the Nature of Science funded by a grant to FFSE from an anonymous donor.

November

At the annual Volunteer Reception sponsored by FFSE, Fermilab Director Pier Oddone presented the 2009 Director's Award to Suzanne Weber for her many years of volunteering with the Saturday Morning Physics program. Finalists Michael Cooke and Erik Ramberg also received recognition. The reception is a way of thanking the hundreds of volunteers who contributed to science education at Fermilab during the year.

December

The year saw a record number of participants in Education Office programs due, in large part, to Fermilab's participation in Science Chicago. More than 42,000 students and nearly 3,500 educators were touched by Fermilab programs during 2009.

Each year Fermilab scientists and docents receive many notes of thanks from students who have been touched by our programs.

See the last page of this report to view some of the notes received during 2009.

PERSONNEL

The success of the 2009 FFSE programs rests with these outstanding program leaders.

Christine Ader, Fermilab • **Michael Albrow**, Fermilab • **Michael Bachrodt**, Fremd High School, Palatine • **Maurice Ball**, Fermilab • **Leo Bellantoni**, Fermilab • **Richard Billings**, Montini Catholic High School, Lombard • **Cathy Blozis**, Batavia High School • **Georgia Brown**, Northern Illinois University • **James Browne**, Amboy High School, Amboy • **Sue-Z Bruno**, Gates Elementary School, Aurora • **Jill Burke**, Western Springs School District 101 • **John Chamberlain**, Glenbard North High School, Carol Stream • **Alex Chen**, Fermilab • **Jennifer Ciaccio**, West Chicago High School, West Chicago • **Penelope Constanta**, Fermilab • **Michael Cooke**, Fermilab • **Trudi Coutts**, Naperville Community Unit School District 203, Naperville • **James D. Cox**, Clarendon Hills Middle School, Clarendon Hills • **Laura Cox**, Glenbard South High School, Glen Ellyn • **Karl Craddock**, Fremd High School, Palatine • **Larry Cwik**, Seton Academy • **Robin Dombek**, Maple Middle School, Northbrook • **Sue Doser**, DuPage Area Occupational Education System • **Brian Drendel**, Fermilab • **Luciano Elementi**, Fermilab • **Jason English**, Fremd High School, Palatine • **Todd Ernst**, Valley View School District 365U • **Amy Fehrman**, Johnson Elementary School, Warrenville • **Patricia M. Franzen**, Wild Enterprises, Metamora • **Ford Garberson**, Fermilab • **Lynn Garren**, Fermilab • **Vanessa Gaultney**, Fermilab • **Camille Ginsburg**, Fermilab • **Susan Gloss**, St. Charles East and North High Schools • **Barbara Greenberg**, National Louis University • **David Harding**, Fermilab • **Elvin Harms**, Fermilab • **Anne Heavey**, Fermilab • **Samantha Kaushalya Hewamanage**, Fermilab • **Amber Johnson**, Fermilab • **David Johnson**, Fermilab • **Randy Jones**, Glen Ellyn School District 41, Glen Ellyn • **Steve Keefe**, teacher, retired • **Nikki Kitzmiller**, Rotolo Middle School, Batavia • **Shari Klatt**, Geneva High School • **Tom Knutson**, Glenbard North High School, teacher, retired, Carol Stream • **Sharon Lackey**, Fermilab • **Cindy Langemack**, DuPage Career Education Center, DuPage County • **Leon Lederman**, Fermilab • **Robert Lewis**, Downers Grove North High School, Downers Grove • **Lucy Litvinenko**, Fermilab • **Paul Madsen**, Rosary High School, Aurora • **Kristen Maier**, Barry Elementary School • **Lee R. Marek**, University of Illinois, Chicago • **Michael McGee**, Fermilab • **Tom Meyer**, Fermilab • **Jill Mueller**, West Chicago Middle School, West Chicago • **Dennis Nicklaus**, Fermilab • **Paul Nienaber**, Fermilab • **Heath O'Connell**, Fermilab • **Mary Sue Offut**, SciTech and Field Museum volunteer, Aurora • **Glenda Peck**, Alice Gustafson Elementary School, Batavia • **Pat Pentek**, West Chicago Middle School, West Chicago • **Michelle Prewitt**, Fermilab • **Jennifer Pursley**, Fermilab • **Chris Quigg**, Fermilab • **Tom Redig**, Downers Grove North High School, Downers Grove • **David Ritchie**, Fermilab • **Barbara A. Romack**, Kaneville North Elementary School, Elburn • **Rob Roser**, Fermilab • **Tim Rupp**, Fermilab • **Brittany Rutherford**, Fermilab • **Jamie Santucci**, Fermilab • **Niki Saoulidou**, Fermilab • **Dave Schmitz**, Fermilab • **Valena Sibley**, Fermilab • **Sharon Sloan**, Belvidere North High School • **Marsha Stierwalt**, Alice Gustafson Elementary School, Batavia • **Chris Stoughton**, Fermilab • **Patrick Swanson**, Hoffman Estates High School, Hoffman Estates • **Diego Tonelli**, Fermilab • **Linda Valerio**, Fermilab • **Mary Van Slyck**, Bartlett High School • **Karen Weigt**, Kaneland John Stewart Elementary School, Elburn • **Jeremy Werner**, Fermilab • **Chris White**, Fermilab • **Herman White**, Fermilab • **Wayne R. Wittenberg**, Benjamin Franklin School, Glen Ellyn • **Jim Zagel**, Fermilab • **Jerry K. Zimmerman**, Fermilab • **Anna Zuccarini**, Crone Middle School, Naperville

Education Office staff administers and supports the program leaders.

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Docents facilitate student field trips and other Education Office activities and supervise the Lederman Science Center.

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REVENUES AND EXPENSES

| | 2008 (audited) | 2009 (audited) | 27 years (1982-2009) |
|--------------------------------------|-------------------|-------------------|-------------------------|
| Revenue/Contributions (\$000) | | | |
| Public Agencies | \$ 0.0 | \$ 1.0 | \$ 4,236.2 |
| Private Foundations | 91.6 | 14.0 | 929.8 |
| Membership | 17.7 | 10.4 | 365.2 |
| Other | 14.4 | 210.8 | 620.3 |
| Total Revenue/Contributions | \$ 123.7 | \$ 236.0 | \$ 6,151.5 |
| Expenses | | | |
| Programs | \$ 112.1 | \$ 207.4 | \$ 4,513.4 |
| Administrative Overhead | 48.7 | 38.6 | 1,515.9 |
| Total Expenses | \$ 160.8 | \$ 245.9 | \$ 6,029.2 |
| Excess (deficit) of | | | |
| Revenue/Contributions | | | |
| over Expenses | \$ (37.1) | \$ (9.9) | \$ 122.4 |

ACKNOWLEDGEMENTS

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 Geneva Schools
 Illinois Chemical Education Foundation
 Illinois Department of Natural Resources
 Kane County Board of Education
 Science Chicago
 Wildlife Conservation Society

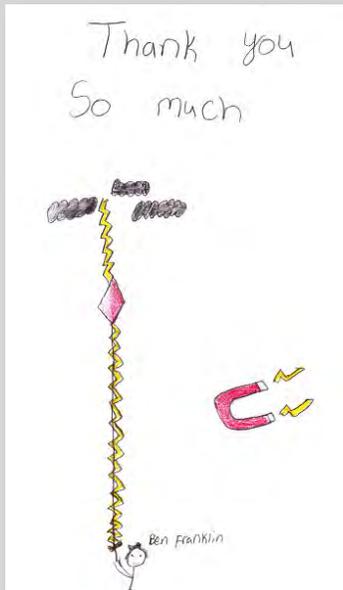


Making an Impression

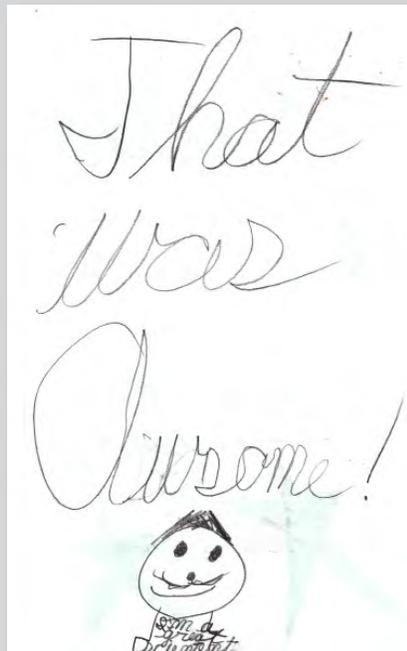
Fermilab scientists Jim Zagel and Anne Heavey visited Dean Street Elementary School in Woodstock, Illinois as part of Fermilab's ongoing classroom visitation program. The thank you notes they received from students demonstrate clearly the impression that these travelling presentations make on their audiences.



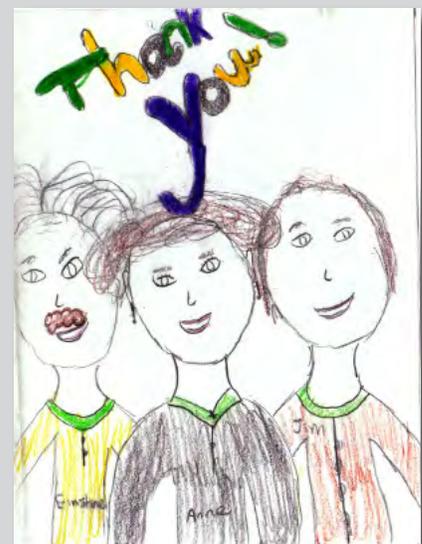
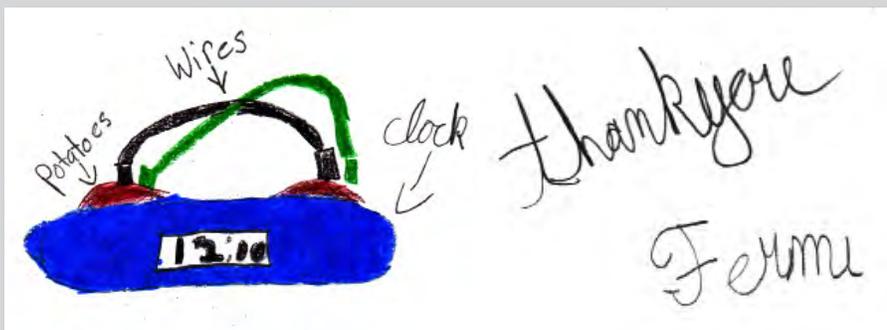
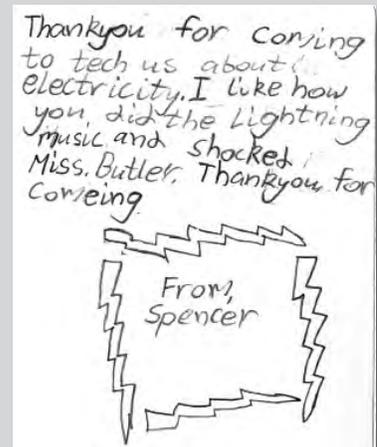
Einstein: "I'm so proud of you!"



Ben Franklin



"I'm a great scientist."



Albert Einstein, Anne and Jim