

*Fermilab Friends  
for  
Science Education*

*Annual Report  
2003*



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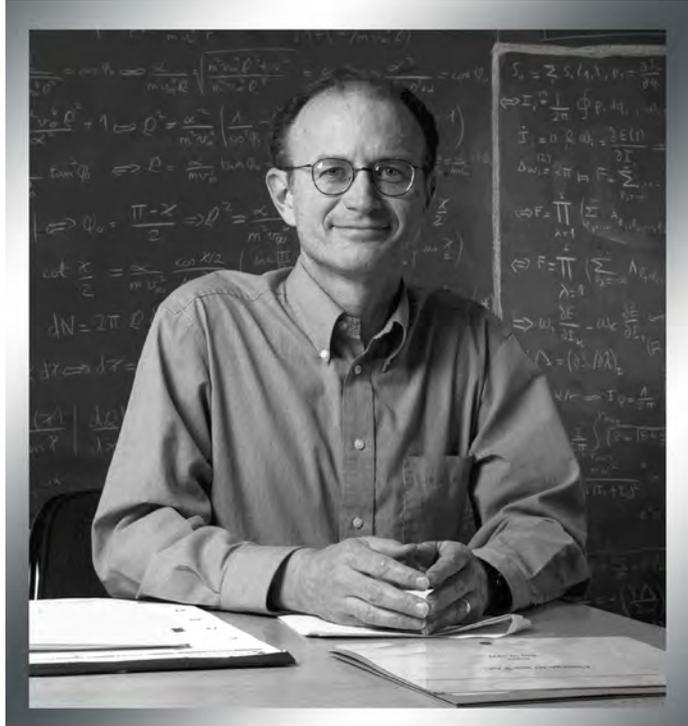
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Leaders in education, government, and industry regularly stress the importance of doing a better job at teaching science. Our society needs to have a workforce that knows and understands science. Recently, the Hart-Rudman Report on National Security emphasized the importance of training “the needed numbers of science and engineering professionals as well as qualified teachers in science and math.” We also need a broad community of people with sufficient education to understand the many scientific issues that have an impact on our public life.

It is easier to diagnose this problem than to know how to fix it. In this environment, the experience of the Fermilab Education Office is particularly valuable. As a result of its programs, the students in the surrounding communities are receiving the full benefit of the special resources that are available at a great scientific laboratory. We need the continued strong support of Fermilab Friends for Science Education (formerly Friends of Fermilab) to maintain the quality of our science education programs.

I am grateful for the support that FFSE gives to the Education Office. FFSE and Fermilab have developed a uniquely productive partnership over seventeen years. Please help us keep up the good work.



*Michael Witherell*

*Michael Witherell, Director  
Fermi National Accelerator Laboratory*





**T**wenty years! That's how long Friends of Fermilab, now called Fermilab Friends for Science Education, has been providing support for Fermilab's precollege science education programs. FFSE continues to fulfill its mission to:

- Encourage young people to pursue careers in science and engineering.
- Enhance the quality of precollege science education in public and private schools.
- Promote a broader public awareness and understanding of science.

With support from Fermilab Friends for Science Education, the Fermilab Education Office is able to offer in-depth staff development programs that have a lasting impact on science education. These institutes and workshops have relatively high costs compared with other programs offered at the Lederman Science Center.

Fermilab Friends for Science Education supports Saturday openings of the Lederman Science Center. In 2002 FFSE initiated a scholarship program for teachers to attend workshops, buses for class field trips and children who attend science adventures. In addition, FFSE covers unusual program costs that grants may not cover; those "little things" are often the special touches that make teachers feel welcome at Fermilab.

Precollege education programs continue to enjoy strong support from Fermilab director, Michael S. Witherell, and staff feels comfortable volunteering to help with our programs. In fact, over 200 individuals volunteer each year. With a new name and continued support from our members, FFSE will maintain its role as a leader in precollege science education in the 21<sup>st</sup> century.



*Marjorie G. Bardeen*

*Marjorie G. Bardeen, President  
Fermilab Friends for Science Education*



## Awards Programs

This year FFSE began a program to honor high school science students in DuPage and Kane counties. The Fermilab Science Award recognizes two students at participating high schools who have demonstrated a strong commitment to excel in the study of science.

The schools select the students using their own criteria and send the names to us. FFSE provides a certificate and a book that schools present at an appropriate awards ceremony.

Schools participating in the first year include: Addison Trail High School, Aurora Central Catholic High School, Aurora Christian High School, Batavia High School, Burlington Central High School, Downers Grove South High School, Driscoll Catholic High School, East Aurora High School, Fenton High School, Fox Valley Lutheran Academy, Glenbard North High School, Glenbard South High School, Glenbard West High School, Hinsdale Central High School, Immaculate Conception High School, Larkin High School, Lisle Senior High School, Montini Catholic High School, Rosary High School, St. Charles East High School, St. Edward Central Catholic High School, West Aurora High School, West Chicago Community High School, Wheaton Academy, Wheaton North High School, Wheaton-Warrenville South High School, Willowbrook High School and York Community High School.

FFSE offered **scholarships** to teachers and families to attend teacher workshops, class field trips and student classes held at Fermilab.

Teachers may apply for a scholarship to attend the workshops for curriculum units that connect to the topics they teach in your schools. Teachers who teach the unit can bring their students to Fermilab for field trips. Teachers may also apply for a scholarship for up to \$100 in transportation reimbursement. Families may apply for family vouchers for free classes through the Science Adventures program.

This year we awarded scholarships to Susan LaGripp, Dundee Middle School, Louise Voegtle, Jefferson Elementary School, Deborah Gilbert, Pershing Elementary School, Karne Jensen, Rose E. Krug School, Susan Foody, St. Peter School, Paula Valleskey, Wayne Elementary School and Cathy Grochowski, Westfield Community School. We also awarded scholarship for Science Adventures to two families.





## Summer Secondary Science Institutes

One of Friends' earliest projects was the Summer Institute for Science Teachers. These four-week institutes conducted in the 1980s expanded the skills and horizons of a generation of teachers, many of whom became leaders in their field.

This year planning began for a new series, the Summer Secondary Science Institutes. To reflect the new reality that teachers have more summer demands on their time, the Institutes will be organized into four one-week sessions. Each session will be independent of, but connected to, the other three, so teachers may enroll in as many or as few as they like. The target audience for these

courses is new teachers and teachers teaching out of field.

In the summer of 2004, the physics sessions will be piloted. The topics for the four weeks will be: mechanics; electricity and magnetism; waves, optics, and sound; and astrophysics and relativity. Each week will feature content instruction in the topic, hands-on techniques appropriate to the high school classroom, and connections to modern physics and Fermilab.

We plan to launch programs for chemistry and biology in the summer of 2005.





## Program Highlights -

**May** – FFSE presented Fermilab Science Awards to 54 students from 28 high schools in DuPage and Kane counties. The FFSE Scholarship Program awarded a total of \$1,325 to 9 teachers for workshop stipends and \$300 to support busses for 3 field trips. Two families received certificates toward Science Adventures.

**June – The Annenberg/CPB Leadership Academy** (based on the series “Assessment in Math and Science: What’s the Point?”) drew professional development providers from IA, IL, MI, MN, WI. The academy was funded by NCEMSC through FFSE.

FFSE supported major work on the **exhibit upgrade**. Contractors installed the electronics pulling wires to monitors for showing short video introductions to the Lederman Science Center in the four exhibit areas; replacing old touch screens, laser disc players and computers with newer models and DVD technology; installing a new plasma screen to replace a four-monitor screen and associated carpentry.

**July – Science Adventures** were in full swing. One hundred fifteen students attended 14 classes. Topics ranged from crime busters to Lego engineering and a bike camp.

August - A total of 69 teachers participated in five **workshops**:

*Beauty and Charm - 17 teachers*

*Phriendly Physics-Electromagnetism - 14 teachers*

*Phriendly Physics- Light and Heat - 14 teachers*

*From Beneath the Ashes - 13 teachers*

*Particles and Prairies - 11 teachers*

**September** - With support from the Illinois Consortium for Accelerator Research, FFSE supported the planning for a series of one-week high school teacher **workshops** for summer 2004. Each week covers a different topic, and teachers can sign up for one to four sessions. Topics include: 1) mechanics; 2) optics, waves & sound; 3) electricity & magnetism; and 4) relativity & astrophysics. We plan to expand this model to include chemistry and biology in 2005.

**October** – The Lab invited over 250 staff members to a **reception** honoring their volunteer work with Lab education programs that was hosted by Mike Witherell. Volunteers supported programs administered by Roger Dixon, Erik Ramberg, Dianne Engram, Ron Ray and the Education Office.

November - FFSE inaugurated an **online store** to sell Fermilab logo items including clothing, posters, novelties, golf items and drinkware. Profits from the store support our K-12 education programs. The first day we had \$300 worth of business! ([www.ed.fnal.gov/ffse/store.html](http://www.ed.fnal.gov/ffse/store.html))

We held the **Annual Regional Software Review** at the Lederman Science Center for educators from seven states.

**December - World Summit on the Information Society**, December 8-13, Geneva, Switzerland: We presented our cosmic ray detector project at the CERN exhibit and participated in the RSIS conference held at CERN. These conferences explored the interaction of science and the information society with developing countries.

January – Beginning in January, FFSE supported three workshops for the Chicago Public Schools **Museum Partners Program**. Two physical science workshops targeted K-4 and 5-8 teachers, and the life science workshop targeted 5-8 teachers. Two high school programs in which we were to participate were cancelled due to low enrollment.

FFSE began providing refreshments for the revamped **Ask-a-Scientist Program**.

February - The Education Office hosted an event for the DuPage and Kane countywide institute day. More than 200 teachers attended two parallel events: the **Symposium** on the Nature of Science in Ramsey Auditorium and the **Science Resource Fair** at the Lederman Science Center. J. Craig Venter of The Center for the Advancement of Genomics gave the keynote talk for both events. The program was



supported by an anonymous donor to FFSE and the Regional Office of Education for DuPage and Kane counties.

**March** - Educators from throughout Illinois came to select from hundreds of publisher-donated items that we weeded out of the TRC collection. Items included materials such as older editions of curriculum materials, field editions, extra copies, educational software no longer available from the publisher, and equipment.

Weird Science presented the **Wonders of Science** show that was held as a kickoff for the Office of

Science and Technology Policy's Excellence in Science, Technology, and Mathematics Education (ESTME) Week. Ramsey Auditorium was sold out for the event.

**April** - We offered two **ecology workshops**: a teacher workshop on "How to Plant and Maintain a School Prairie" for the Illinois Department of Natural Resources and an Illinois Biodiversity Workshop in connection with Chicago Wilderness.





## Exhibit Upgrade at Lederman Science Center

During the past year, FFSE raised \$25,000 to upgrade the electronics and media for many of the multimedia exhibits at the Lederman Science Center.

Staff made improvements in three main areas:

1. Replacing videodisc-based exhibits and a computer exhibit with DVD-based systems.
2. Replacing monitors for four exhibits and the videowall.
3. Adding four DVD players and controllers with remote buttons to be used with existing monitors and a new Video Display System.

Replacing videodisc-based exhibits and a computer exhibit with DVD-based systems

Three exhibits used videodisc players and controllers. These were Primordial Soup, Inner Space and Outer Space. Visual Media Services converted the video to DVD media. We replaced the videodisc players with industrial DVD players and replaced the videodisc controllers with DVD controllers. We reprogrammed the DVD controllers to use the new media.

The Accelerator Kiosk used a computer and videodisc player. To simplify maintenance, we converted this exhibit to an industrial DVD player and a special touch screen that communicates directly with the DVD player. We have written a new script so that VMS can produce a new video. We will be authoring a DVD for the exhibit.

Replacing monitors for four exhibits and the videowall

We replaced the monitors for the Inner Space and Outer Space exhibits and the touch screens for the Four Forces and  $E=mc^2$ . The

computer-based exhibits needed updated systems to keep up with changing technology.

We replaced a 2x2 array videowall in the Ideas Room with a handsome 50" plasma monitor. We added more controls to display video from other sources (DVD player and computer) and from an Industrial DVD player interfaced to a controller with wall-mounted remote buttons.

Adding four DVD players and controllers with remote buttons to be used with existing monitors and a new Video Display System.

To enhance the visitor experience, we provided an introductory video for each room (Accelerators, Detectors, Methods, or Ideas) and for the Lederman Science Center in general. Casual visitors get background on the topic of each room and how the exhibits relate to the topic. They have the possibility of playing at least two videos in each room: a room introduction and the general intro to the Center exhibits that is the same for all four rooms. Visitors start these by pressing a remote button connected to a DVD controller. A loop playing on the monitor tells the visitors where the remote buttons are. The video monitors for three rooms are currently part of our closed circuit TV. By switching between channels, we can access either the video from DVD or channel 13, the accelerator status. All the video equipment is in a central closet and has the remote button wiring from each room back to the closet. The fourth DVD player is connected to the plasma display in the Video Display System in the Ideas Room.

We have written scripts for these videos and VMS has completed the general introduction with Leon Lederman welcoming visitors to the center. VMS plans to complete the individual room videos early in the coming year.





*The success of the 2003 FFSE programs rests with these outstanding program leaders:*



## Revenue and Expenses

	2002 (audited)	2003 (audited)	21 years 1982-2003
<u>Revenue/Contributions (\$000)</u>			
Public Agencies	\$140.6	\$103.3	\$4,188.4
Private Foundations	1.0	48.3	560.9
Membership	14.9	14.3	259.8
Other	10.8	10.6	314.1
Total Revenue/Contributions	<u>\$167.3</u>	<u>\$176.5</u>	<u>\$5323.2</u>
 <u>Expenses</u>			
Programs	\$201.7	\$119.7	\$3,840.8
Administrative Overhead	31.0	24.0	1,310.3
Total Expenses	<u>\$232.7</u>	<u>\$143.7</u>	<u>\$5,151.1</u>
Excess (Deficit) of Revenue/Contributions over Expenses	(65.4)	32.8	172.1

## Acknowledgments

Fermilab Friends for Science Education depends entirely on contributions and grants. We thank the Fermilab Friends for Science Education members, Tree of Knowledge contributors and the following organizations for their generous support of Fermilab education programs.

