



# Fermilab Local Impacts and Engagement

Snowmass Workshop on Local Community Impacts

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# History of Education and Public Engagement at Fermilab

- Fermilab has a long history of engaging with its community.
- Fermilab's first director, Robert R. Wilson, was a sculptor and blended his physics with his art.
- Angela Gonzales, ID #11, joined the Fermilab team in 1967 and created a visual identity of Fermilab. Fermilab's Art Gallery and Arts and Lecture Series continue this tradition.
- Fermilab's Second Director, Leon Lederman, was committed to education, starting the Saturday Morning Physics program in 1980 and launching education programs that grew into the Lederman Science Center, dedicated in 1992.
- Fermilab's current EPE offerings reach around 100,000 people a year.



*"I have always felt that science, technology, and art are importantly connected, indeed science and technology seem to many scholars to have grown out of art."* — Robert Rathbun Wilson, Fermilab founding director

# Overview of Current Fermilab Education and Public Engagement (EPE) Programs

Fermilab Education and Public Engagement programs seek to connect the local, national, and international community with Fermilab's mission and science. EPE programming focuses on both in and out of classroom engagement.

- **Community Advisory Board** connects Fermilab to local community leaders
- **Fermilab Family Open House** brings around 4,000 people on site annually in February (virtual in 2021 and 2022) to learn about and engage in Fermilab Science.
- **The Fermilab Art Gallery** hosts exhibits that show the connections between art and science. The annual Artist in Residence programs brings artists to Fermilab to create a body of work based on their interactions with Fermilab Science.
- **Arts and Lecture Series** hosts evening performances and lectures for the local community. Events regularly fill the Ramsey Auditorium which holds over 800 people. Virtual lectures have attracted thousands from across the globe.
- **Ask-a-Scientist**, held monthly, connects the public to Fermilab through talks, tours, and an extensive Q&A session with a panel of scientists. This program is currently being held virtually, including virtual guided tours and attracts roughly 100 participants a month.
- **QuarkNet** is a partnership between Fermilab and the University of Notre Dame that engages high school teachers and students in active research projects using real experimental high-energy physics data.

# Overview of Fermilab EPE Programs (cont.)

- **Saturday Morning Physics** is an eleven-week introduction to Fermilab science for high school students. It transitioned to a virtual program in 2020.
- **The Lederman Science Center** serves as a hub for Fermilab educational programming and houses exhibits for the public to give them a hands-on experience with Fermilab science.
- **Field Trips** Fermilab has an extensive field trip program, serving over 35,000 students a year. Students tour the lab, learn about Fermilab science through hands-on activities at the Lederman Science Center, and talk with Fermilab employees and users.
- **Teacher Workshops** Fermilab's Teacher Workshops teach K-12 teachers how to bring Fermilab science to their classrooms. Taking place each summer, these workshops were held virtually in 2020 and 2021.
- **STEM Career Expo** The annual STEM Career Expo, attracting roughly 1,500 students per year, provides high school students with the opportunity to meet scientists, engineers, & technicians from a variety of careers, including careers outside of Fermilab.
- **Classroom Presentations and Career Talks:** Fermilab employees and users visit K-12 classrooms, in person and virtually, to discuss their work at Fermilab. Over 1,800 students benefited from the program in 2019.

# Impact of Saturday Morning Physics

“On a personal note, I am thrilled to rejoin your ranks. It’s an opportunity to build on a decades long affection for DOE, starting in high school as a participant of [Fermilab’s Saturday Morning Physics](#) program.”

-Tarak Shah  
DOE Chief of Staff

# Community Engagement in EPE Planning Process

- Fermilab engaged in a strategic planning process in 2020-2021 to develop an updated strategic plan for Education and Public Engagement.
- Local community members served as part of the planning process, including:
  - School district administrators from local districts that serve underserved communities sat on the Strategic Planning Serving Teachers and Students task force.
  - CAB member represented community concerns on the Strategic Planning Serving Communities task force.
  - Teachers on STEM Career Expo planning committee to ensure alignment with school needs.

# Fermilab Community Advisory Board (CAB)

- Fermilab's EPE office serves as the liaison between Fermilab and the local community, including local residents, cyclists, runners, and other site visitors
- Established in 2009, the Fermilab Community Advisory Board (CAB) facilitates communication between Fermilab and the surrounding communities
- The board is composed of local community leaders and meetings are open to the public.
- The Fermilab Site Office has a seat on the board
- CAB meetings are held bimonthly
- The website, <https://www.fermilabcommunity.org/>, has upcoming meeting dates, meeting agendas, and the minutes of past meetings.

# Fermilab Community Advisory Board (CAB) Cont.

- The CAB is particularly interested in topics that affect their community such as construction and site access.
- Members initially agree to serve for a two-year terms; membership may continue after initial term
- CAB member sat on Strategic Planning task force to ensure community concerns and needs were represented in the final plan
- Past agenda items have included updates on the the Long Baseline Neutrino Facility/Deep Underground Neutrino Experiment (LBNF/DUNE), a discussion of various careers and Fermilab, a presentation on the PIP-II accelerator upgrade project, and regular updates on site construction and upcoming public events, including the annual February Family Open House.



# ACT-SO Partnership

- Fermilab participated in the DuPage County Afro-Academic, Cultural, Technological and Scientific Olympics ([ACT-SO program](#)). ACT-SO is a nationwide program sponsored by the NAACP that encourages high academic and cultural achievement among African-American high school students.
- The seven-month local program features leadership development sessions, one-on-one mentorship and service activities, culminating in an academic competition where students present their projects. The gold medalists then compete against winners from other cities at the national ACT-SO finals, held during the NAACP National Convention in July.
- Two Fermilab mentors, Manolis Kargiantoulakis and Marco Mambelli, worked with students over the past year in conjunction with the program run by Argonne National Laboratory.
- Fermilab is developing a direct partnership with the DuPage County Chapter of the NAACP and working to transfer ACT-SO participation into future STEM opportunities at Fermilab.

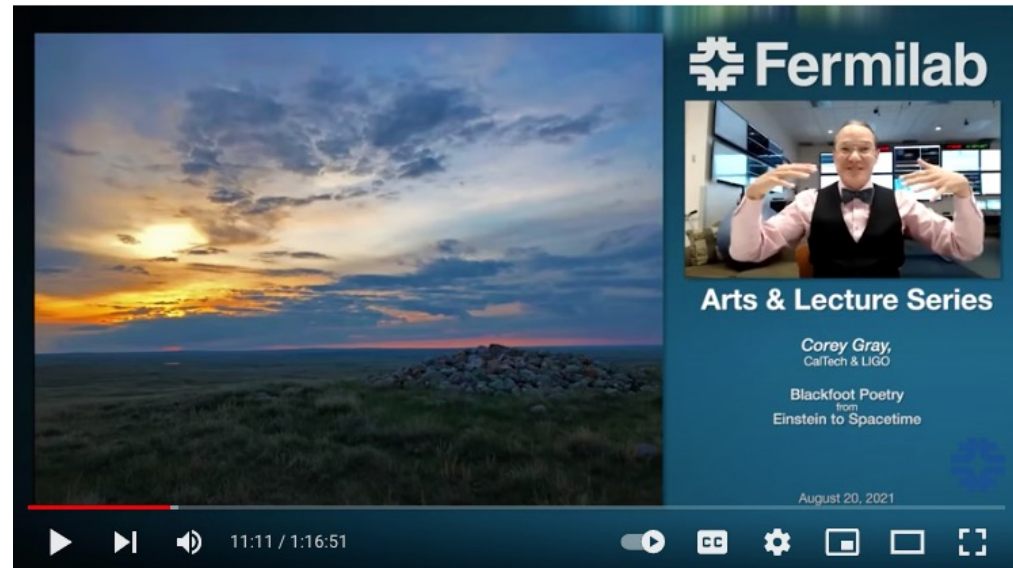
# Local Indigenous Community Partnerships in EPE Programs and Spaces

- Ongoing dialog with the American Indian Center of Chicago and Trickster Cultural Center
- Communicating with local Indigenous communities regarding programming and signage language and content
- Updating area outside of the Lederman Science Center to incorporate native plants and information on Indigenous peoples' connection to the land on which Fermilab sits; drafting Land Acknowledgment Statement.



# Partnership and with Indigenous Communities in Fermilab Arts Programming

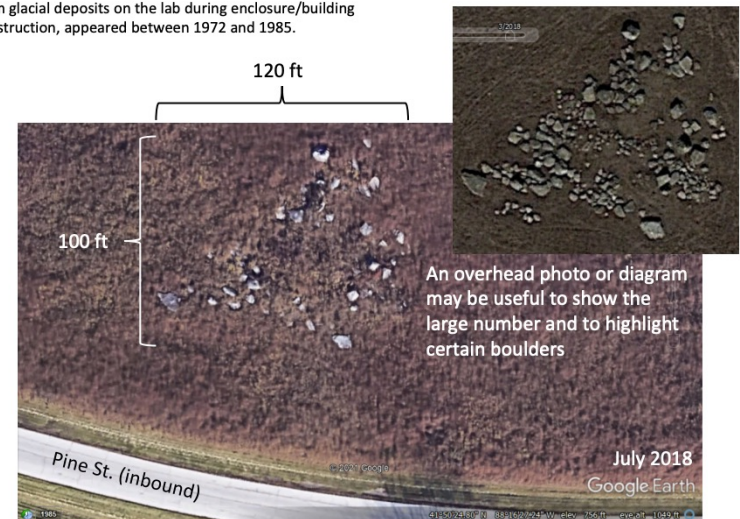
- Fermilab Art Gallery is partnering with [Schingoethe Center](#) at Aurora University to bring indigenous artists to exhibit at Fermilab. The Center's mission is to foster inquiry, celebrate artistic excellence, preserve and perpetuate Native American cultures, and inspire a lifelong engagement with the visual arts.
- In August 2021, the Fermilab Arts and Lecture series held a virtual talk from [LIGO operator Corey Gray](#), a member of the Siksika Nation, who, in conjunction with his mother, is reclaiming their Blackfoot language through translations of LIGO science.



# Boulders, Glaciers, and Fermilab Science Exhibit

- Developing potential exhibit at Fermilab and associated educational materials focusing on the science of excavation connected with Fermilab experiments.
- Exhibit would be comprised of native and non-native boulders unearthed through excavation of Fermilab experiments.
- Plan would be to highlight the geological history of the Fermilab site and the science that goes into excavation.
- Would include Indigenous framing of educational materials through partnership with Trickster Cultural Center.

**Pine Street Boulder Pile**  
Glacial erratic boulders presumed to have been excavated from glacial deposits on the lab during enclosure/building construction, appeared between 1972 and 1985.



# Other Local Engagement - Internships

Fermilab has a broad range of internships, including :

- **TARGET internship:** six-week summer internship for Illinois high school sophomores and juniors who have a strong interest and demonstrated an aptitude for physics, mathematics, computer science, and engineering. Increasing the number of minorities (Black, Hispanic/Latino, Hawaiian/Pacific Islander, Alaska Native/American Indian) and women in science, engineering, and computer science is a program priority.
- **SIST** (Summer Internships in Science and Technology): Undergraduate sophomores and juniors majoring in physics, engineering (mechanical, electrical and computer), materials science, mathematics and computer science conduct research with Fermilab scientists and engineers. SIST aims to increase the representation of underrepresented groups and women in scientific research and the engineering workforce.
- **VetTech:** A Fermilab VetTech is a military veteran intern who provides routine technical support for an assigned experiment or support group.
- **Accelerator Science Program to Increase Representation in Engineering, or ASPIRE:** A partnership between Fermilab and Midwest colleges and universities for undergraduate and graduate (masters) engineering students who are historically and contemporarily underrepresented in accelerator engineering fields.

# Other Local Engagement – Groundbreakings and Other Events with Key Stakeholders and Community Leaders

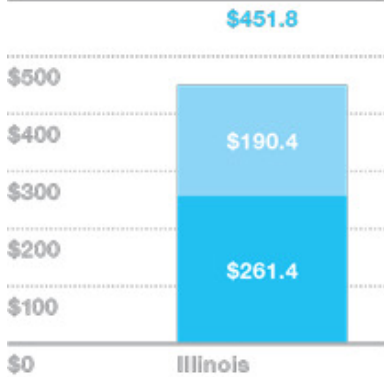
- Example: Groundbreaking for PIP-II particle accelerator project, March 2019



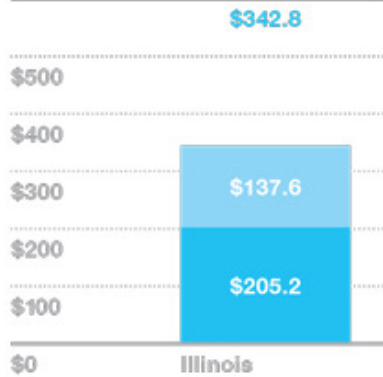
# Local Impacts - Economic Impact in Illinois

## Economic impact of Fermilab, 2018

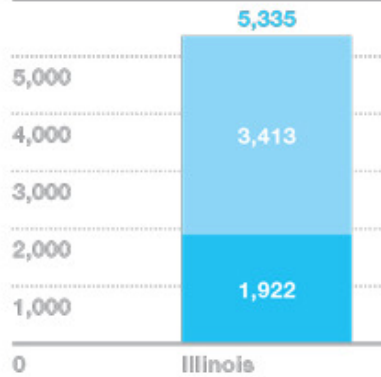
Output (in millions)



Earnings (in millions)



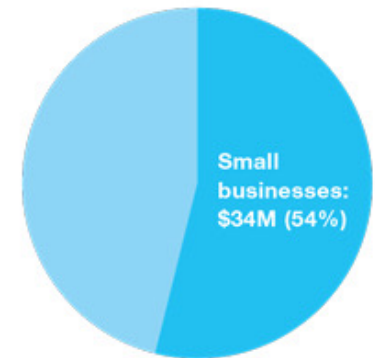
Employment



■ Direct ■ Indirect

## Direct spending on Illinois businesses

Total: \$63M in 2018



<https://news.fnal.gov/2019/12/fermilabs-economic-impact-in-illinois/>

In addition to detailing the economic impact in Illinois, Fermilab works with Sanford Underground Research Facility to highlight the impact of the Long Baseline Neutrino Facility/ Deep Underground Neutrino Experiment (LBNF/DUNE) in South Dakota, including expected economic impact and jobs.

# Engagement and Impact - Partnerships

Example: Superconducting Quantum Materials and Systems Center (SQMS), a National Quantum Center hosted by Fermilab with partners from National Laboratories, Universities, and Industry

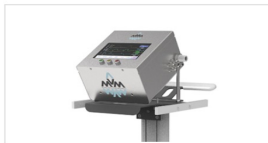




# Engagement and Impact – Pandemic Assistance

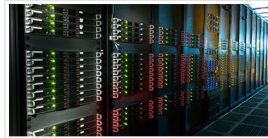


Fermilab is in the fight against COVID-19. Here's how our scientists, engineers, and computer professionals are helping.



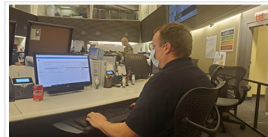
## MVM ventilator: Simplified ventilator designed by particle physics community gets FDA approval

More than a dozen Fermilab volunteers have helped design, test and finalize the Mechanical Ventilator Milano, a low-cost ventilator to help in the midst of device shortages caused by COVID-19. In a little over a month, a team of physicists and engineers from around the world took a simplified ventilator design from concept all the way through approval by the U.S. Food and Drug Administration. This major milestone marks the ventilator as safe for use in the United States under the FDA's Emergency Use Authorization, which helps support public health during a crisis.



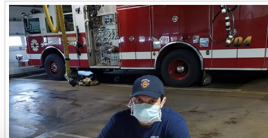
## Fighting COVID with computing: Fermilab, Brookhaven, Open Science Grid dedicate computational power to COVID-19 research

Scientists and engineers at Fermilab and Brookhaven National Laboratory are uniting with other organizations in the Open Science Grid to help fight COVID-19 by dedicating considerable computational power to researchers studying how they can help combat the virus-borne disease.



## Serving society: Keenan Newton volunteers as Illinois incident manager

Fermilab employee Keenan Newton serves the Illinois Emergency Management Agency, volunteering his personal time to help people during the current pandemic and responding to hazardous situations while based at the State Emergency Operations Center in Springfield.



## Uniting with local community: Fermilab Fire Department ready to respond to area COVID-19 cases

As with all first responders across the nation, the Fermilab Fire Department stands ready to act should they be called upon to help with a COVID-19 incident in the areas surrounding the suburban Illinois laboratory.

<https://www.fnal.gov/pub/about/covid19/>

# Questions?

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