

## CAB meeting notes for May 23, 2024

### Slide 2

#### **Fermilab's Bonnie Fleming newly elected to the American Academy of Arts & Sciences**

Bonnie Fleming elected as a member of the [American Academy of Arts & Sciences](#) in [Mathematical and Physical Science](#).

<https://news.fnal.gov/2024/04/fermilabs-bonnie-fleming-newly-elected-to-the-american-academy-of-arts-sciences/>

### Slide 3

#### **Fermilab drives economic growth in Illinois and South Dakota**

A new economic impact study shows the growing positive effects on economies in the U.S. through operations conducted by Fermi National Accelerator Laboratory. In Illinois and South Dakota, positive ripple effects from Fermilab spending contributed \$1.6 billion in economic output during fiscal year 2022 and supported 7,242 jobs.

<https://news.fnal.gov/2024/03/fermilab-drives-economic-growth-in-illinois-and-south-dakota>

### Slide 4

#### **Fermilab announces new chief operating officer and new CFO**

Greg Stephens joined the lab as new chief operating officer May 6, 2024, Leadership appointment enhances team at Fermilab with extensive operations experience.

<https://news.fnal.gov/2024/05/fermilab-announces-new-chief-operating-officer/>

### Slide 5

#### DUNE update

#### **Prep work for DUNE at Fermilab nears completion**

As excavation work wraps up in South Dakota, site work at Fermilab's Batavia campus is setting the stage for the next phase of the international DUNE collaboration. Metrics highlight: 1,200 views.

<https://news.fnal.gov/2024/04/prep-work-for-dune-at-fermilab-nears-completion/>

## Newsroom article and press releases

### Slide 6

#### **Double delivery of baby bison at Fermilab**

Bison season began on April 26 when two bison calves were born at Fermilab.

As of today, there are 18 bison calves. \*Metrics highlight: 2,300 views\*

<https://news.fnal.gov/2024/04/double-delivery-of-baby-bison-at-fermilab-today/>

### Slide 7

**New collaboration sheds bright light on advancing semiconductor production in the U.S.**

Fermilab entered into a Cooperative Research and Development Agreement with xLight, Inc. focused on collaboration to develop critical components key to semiconductor manufacturing in the U.S. The work under the first project of the CRADA will focus on superconducting radio frequency cavity and cryomodule development and testing — two areas in which Fermilab researchers have years of experience and expertise. <https://news.fnal.gov/2024/04/new-collaboration-sheds-bright-light-on-advancing-semiconductor-production-in-the-u-s/>

## Slide 8

### Symmetry

- **A physicists' guide to the ethics of artificial intelligence** *Physics may seem like its own world, but different sectors using machine learning are all part of the same universe.*
- **AI for control rooms** *Scientists inside and outside of particle physics and astrophysics are leaning on AI for assistance with complex tasks.*
- **Machine learning and experiment.** *For more than 20 years in experimental particle physics and astrophysics, machine learning has been accelerating the pace of science, helping scientists tackle problems of greater and greater complexity.*
- **Physics vocabulary: AI edition** *Don't know your convolutional neural networks from your boosted decision trees? Symmetry is here to help.*
- **'This is our Muon Shot'** *In December, the Particle Physics Project Prioritization Panel released its recommendations for the future of the field. Among the top priorities was research and development toward future accelerator technology, with a specific mention of the concept of building a muon collider in the U.S.*

## Slide 9

### Videos

- Even Bananas **Can neutrinos escape a black hole?** **\*Over 51K views since May 8**  
Black holes are the ghosts of the universe. Is it possible that our favorite ghost-like particles could tell us something about these cosmic specters? In celebration of [#BlackHoleWeek](#), join [#evenbananas](#) host Dr. Kirsty Duffy and NASA scientist Dr. Regina Caputo as they explore what neutrinos and black holes could reveal about each other. <https://www.youtube.com/watch?v=V00h4m-w2lc>
- Don Lincoln **What are virtual particles?** **131K views in one month**  
Virtual particles are one of those topics of modern physics that just don't sound real. How can particles just appear and disappear without anyone seeing them. In this video, Fermilab's Dr. Don dives into the topic, giving us an understanding of how virtual particles arise from quantum field theory. <https://www.youtube.com/watch?v=ayQhNLqbTFk>
- Behind the Science **Inside the Quantum Networking Lab**  
Take a tour of the "Fermilab Quantum Network"  
<https://www.youtube.com/watch?v=6EqW4Y8ZfTQ>

## Slide 10 – Social Media

## Slide 11 – Educational outreach

### Fermilab In the News

#### Slide 12

##### **First bison babies of year born at Fermilab: ‘Calving season is the most rewarding time of the year’**

Chicago Sun-Times, April 26, 2024

Two American bison were born Friday at Fermilab— the first of about 20 bison expected to be born this spring in a 30-acre pasture at the laboratory.

#### Slide 13

##### **A new tabletop experiment to search for dark matter**

Universe Today, April 4, 2024

A collaboration between the University of Chicago and Fermilab have developed an axion detector called BREAD. It was built to search for dark photon dark matter and the first results showed that BREAD is very sensitive in its frequency range.

##### **ATLAS provides first measurement of the W-boson width at the LHC**

CERN News, April 10, 2024

The ATLAS collaboration measured the W-boson width at the LHC for the first time. The W-boson width had previously been measured at CERN’s LEP collider and Fermilab’s Tevatron collider. This is the most precise measurement to date made by a single experiment, and—while a bit larger—it is consistent with the Standard-Model prediction to within 2.5 standard deviations

##### **Neutrinos offer a new way to investigate the building blocks of matter**

Phys.org, May 21, 2024

Over the course of three years, scientists working on MINERvA recorded more than a million interactions of antineutrinos with other particles. This data allowed scientists to finally calculate the proton’s size using neutrinos, making this a statistically significant measurement of this characteristic.

#### Slide 14

##### **ProtoDUNE’s argon filling underway**

CERN, April 12, 2024

CERN’s ProtoDUNE has entered a pivotal stage: the filling of one of its two particle detectors with liquid argon. The liquid argon will provide a clean environment for precise measurements in neutrino interactions and allow scientists to detect and study neutrino interactions.

##### **NIU students, staff, faculty play roles in Fermilab’s DUNE experiment**

Northern Illinois University, May 2, 2024

A team from Northern Illinois University is part of the 1,400 scientists and engineers working on the Deep Underground Neutrino Experiment. In the coming year, they will be responsible for making 300 to 400 of the photon detection

modules that will be part of the much larger web of thousands of such modules at the underground Long-Baseline Neutrino Facility in South Dakota.

**Solving the mystery of one, then two, dead magnets at Fermilab**

Magnets Magazine, April 16, 2024

The Magnet Detectives investigates the story of the assembly of the US-built magnets for the high-luminosity upgrade to the Large Hadron Collider. By doubling the number of protons inside the LHC and improving the beam dynamics, the upgrade will increase experimental datasets by a factor of 10.

**Slide 15**

**The big idea: are we about to discover a new force of nature?**

The Guardian, April 15

How are cosmology and particle physics connected? Observing the motions of stars and galaxies can reveal the influence of as-yet-undiscovered particles, while studying fundamental particles in the lab can tell us about the birth and evolution of the cosmos.

**New DUNE model at lab visitor center adds perspective to colossal undertaking**

Black Hills Pioneer, May 11, 2024

The Sanford Lab Homestake Visitor Center in Lead, SD has a new centerpiece. A towering three-dimensional model that includes the Open Cut and 370 miles of drifts, ramps, and shafts that make up the Sanford Underground Research Facility was made to convey the giant caverns at SURF for the Long Baseline Neutrino Facility / Deep Underground Neutrino Experiment.