
Fermilab



Welcome to EPE's Life Science Programs!

Research-based Life Science Programming

- Teachers from the surrounding community asked to bring students to the prairie. We were able to develop prairie programs because the NERP existed (established in 1989). We based the program on research at the Lab, as DOE required, along with National Environmental Policy Act (NEPA). ELM (Ecological Land Management) Plan reviewed and approved by Directorate every 4 years.
- First there was **Down to Earth** 1990-1994, **From Beneath the Ashes** 1990-2005, renamed **The Prairie, Our Heartland** 2006-Present, considered for (Science Storylines of the Prairie), but now on pause waiting for an Earth Science Indigenous rewrite, (P&P) **Particles and Prairie** 1991-2016, revised **Energy and Ecosystems: Prairie, Water and Woods** 2016 (to incorporate Ecosystem Services) and **Insects at Work in our World** (2015). Require Community “Citizen” Science program as well. A **HS Life Science** field trip was also developed to meet AP Environmental Science curriculum goals.
- Development of **Ecology at Fermilab** 2022 *virtual* field trip!
- Development of **Boulders, Glaciers and the Science of Fermilab** 2023 with Indigenous co-authorship

Science for All! Learning in Natural Environments

- Connecting students in what they have **access** to and what is most meaningful in their immediate environment to "figure it out" and problem-solve develops confidence which leads to empowerment, ownership of learning, and further scientific investigation.
- Caring for the environment begins with making a personal connection to nature which develops empathy and stewardship. **Indigenous People were the first conservationists.**
- Teachers, through our programs, can build opportunities for students to investigate the outdoors and make these personal connections.
- Learning in natural environments can focus attention, boost all academic performance, improve critical thinking, promote healthy bodies and social-emotional well-being, reduce stress, and increase forward thinking. These health benefits directly impact student learning.

By focusing on **phenomena** that students engage with through their local environment and cultural circumstances you can plan a **foundation** for equity in science experiences.

Lederman Science Center Life Science

Our programs teach thousands of teachers, students and community members the core tenets of what **ecosystem services** are and how they benefit society; They cultivate environmental awareness, an understanding of the fragility of our natural environment and the importance of protecting it by making choices that benefit the earth. In order to protect the sustainability of the planet, everyone needs to commit to becoming a steward.

Stewardship, another foundation of our programs, engages participants in recognizing and resolving environmental problems on-site, locally, regionally, nationally, and globally.

This includes global initiatives such as climate change and enhancement of **biodiversity** and ecosystem services through restoration best practices with **Fermilab as a working model**.

Now, how do we incorporate Indigenous aspect in all that we do and why?



Why Indigenous Engagement?

- Misrepresentation and misinformation in our educational programs – POH/E&E/IWOW/HS Life Science. Desperately need revision with Indigenous authors and collaboration.
- **The 2 most important aspects to Indigenous culture are prairie and the bison.** We have both! They are the foundation of our programs. Give Indigenous community access to land and bison. Essential **opportunity** to make connections to their heritage and educate their community through their oral and traditional wisdom knowledge. Inclusivity.
- Elders give perspective of prairie plants and their relationship with the land. Share history and practices/mutual teaching with Fermilab ecologist. Fermilab ecological team and community will learn from Traditional Ecological Knowledge (TEK). Need to represent Indigenous Wisdom Knowledge as authentic "science" in our programs.
- Educate students and the public "true" history of Indigenous Peoples and represent them in modern day life and modern day careers.
- Reconciliation - begin the "healing" process of a marginalized community - Federal Government atrocities, assimilation, and broken promises have left great mistrust in the path of western expansion.
- Create a Land Acknowledgement Statement. This cannot be done without a strong relationship.

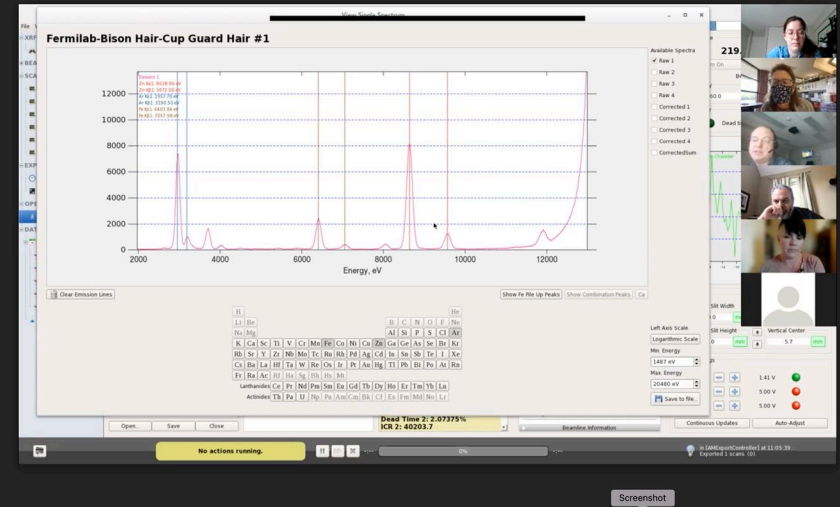
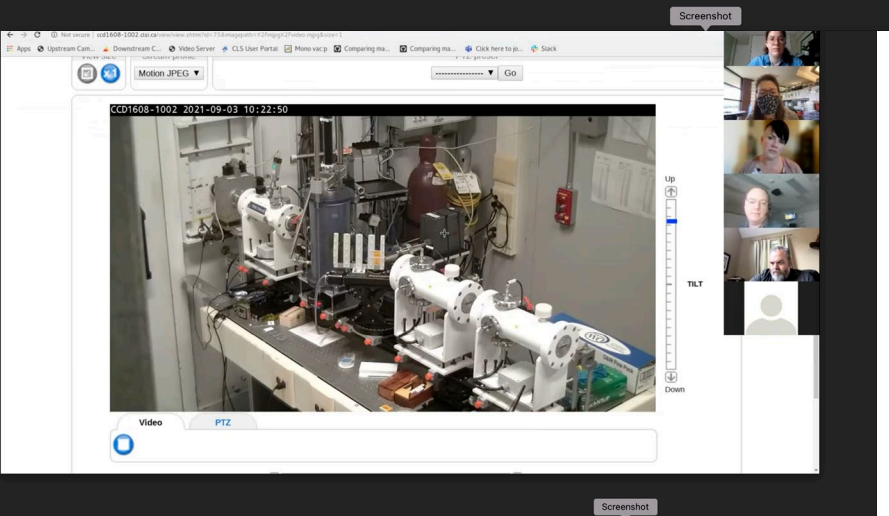
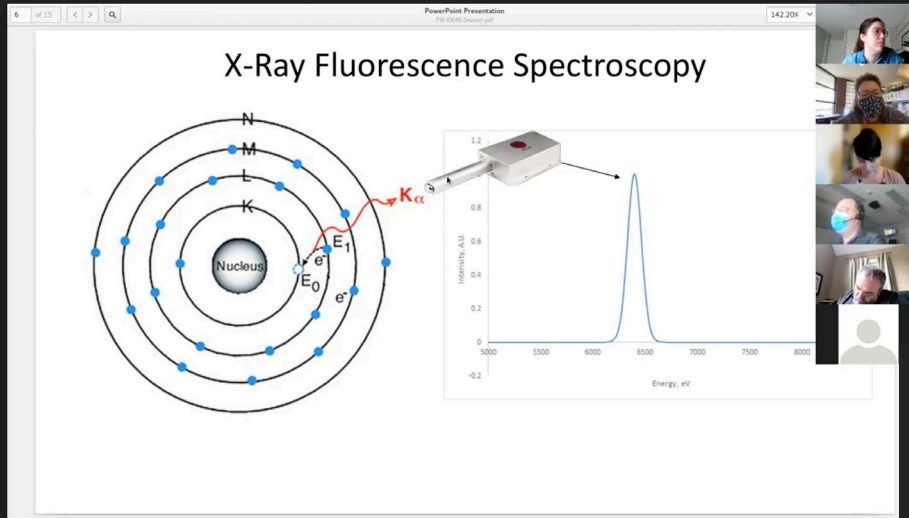
Learning about how to Engage with Indigenous Communities

- Canadian Light Source (CLS) Indigenous Bison Project
- Nachusa Grasslands – CLSI - AIC
- American Indian Center in Chicago
- Form Fermilab Indigenous Committee (Arts and Curriculum)
- Goal to revise Prairie Our Heartland Teacher Workshop and Field Trip
- Trickster Cultural Center in Schaumburg – Ethnobotany and Land Acknowledgement Statement
- “Boulder Crew” and FWAC
- Reconnect with a former Fermilab intern from the Absáalooke (Crow) tribe in Montana through personal discussions of her experience at Fermilab, present efforts to improve our programs, and future opportunities to highlight the role of women and Indigenous people at the lab.
- SURF session! We realized we needed to hire an Indigenous person
- Joseph Standing Bear from Midwest SOARRING in Lockport, Illinois who considers “respect” as the most important aspect of his culture and of a working relationship with Fermilab. Cultural Education Facilitator hire.
- FWAC Boulder Exhibit or LSC Medicine Wheel Garden
- LSC Modernization incorporate Traditional Ecological Knowledge (TEK) and Modern representation of Indigenous People. This could lead to a Land Acknowledgement.



Canadian Light Source Indigenous Bison Project

Bison Hair, Soil, Mineral Lick, and Dung
Analysis future E&E Lab Station
Sharing global data!



Indigenous Professional Development

How do we engage with Indigenous elders, leaders, students and community to benefit both of us?



Canadian Light Source
Centre canadien de rayonnement synchrotron

INDIGENOUS ENGAGEMENT COFFEE TALK SERIES

with Bernie Petit



Introducing a casual coffee talk series of professional development sessions. These sessions are 1 hour in duration and are "attend if you are able" format and are not recorded. If you would like to schedule a session for a different time please contact Bernie Petit at Bernie.Petit@lightsource.ca.

ALL ABOUT OUR SPEAKER

Bernie Petit is an Education Coordinator of Indigenous Programs with the Canadian Light Source Inc. She weaves her extended family's Traditional Anishinaabe/Cree Knowledge, experience as a former Health Director and Director of Operations for First Nations into unique science research projects and teacher resources for First Nation, Metis, and Inuit organizations. Bernie creates Land-Based research projects for Indigenous students to learn how Traditional Knowledge can become a career in research using Canada's only Synchrotron.

PROFESSIONAL DEVELOPMENT: ORGANIZATIONS

For organizations that would like to discuss how they might expand policies, procedures and protocols to create pathways for Indigenous inclusion in Science, Bernie takes you through basic terminology, to supporting reconciliation practices, and tips for change management through an organization's transformation. Each session will be 40 minute presentation and 20 minutes of questions and supportive discussions.

Organizations

Fridays in December & January | 10:30 a.m. CST

- December 3..... Terminology, Tokenism, and Appropriation
- December 10..... Equity, Diversity, and Inclusion in Science
- December 17..... Developing Indigenous Engagement Policy and Protocols
- January 7..... Creating Space within an Organization for Meaningful Indigenous engagement
- January 14..... Reconciliation and Indigenous relationships within Science
- January 21..... Peer-Review Committees, Boards, and sustainability

ZOOM LINK

Join Zoom Meeting
<https://us06web.zoom.us/j/83355389154?pwd=MzBsdnU4E3h0VWw3YUJlZDZDaWw1VkoQT09>

PROFESSIONAL DEVELOPMENT: TEACHERS

This series of 1 hour casual coffee talks is created to spark ways that teachers can expand their Science units to include Indigenous Engagement Basics & Terminology, Weaving Indigenous perspectives into Science, and create a positive pathway for Indigenous inclusion within the classroom. Bernie takes you through basic terminology, to supporting reconciliation practices, and tips for change management through an classrooms' transformation. Each session will be 40 minute presentation and 20 minutes of questions and supportive discussions.

Teachers

Thursdays in February | 3:30 p.m. CST

- February 3..... Terminology, Tokenism, and Appropriation from Public Domain
- February 10..... Oral Education Family Dynamics and Teaching Science
- February 24..... Science Classroom Management and Elder Protocol

ZOOM LINK

Join Zoom Meeting
<https://us06web.zoom.us/j/83274354203?pwd=OXRNWDQza053VWp1UjNlZDZDaWw1VkoQT09>

If you have technical difficulties, please contact education@lightsource.ca

New Fermilab Welcome and Access Center (FWAC) Educational Exhibit: Boulders, Glaciers and the Science of Fermilab

Why Earth Science?

- Way to connect geology to Fermilab physics, ecological restoration, and Indigenous legacy; management of the prairie and bison

- Showcase Geologic and engineering aspects of underground construction to house the science of neutrino research



Boulders, Glaciers, and the Science of Fermilab

Incredible team of Fermilab scientists, classroom teachers, master teachers, and soon to be Indigenous Leader developing this!

The vision - To enhance the experience of employees and the public visiting Fermilab by connecting the authentic science of the laboratory to educational content and curricula, with inclusion of Indigenous culture and TEK science in compliance with Next Generation Science Standards (NGSS).

The goal is to create educational exhibits, in three locations at the laboratory, each with its own unique content and focus. The four exhibits will be in the visitors' center of the new Fermilab Welcome and Access Center (FWAC) building, on the grounds in proximity to the FWAC, and at the Lederman Science Education Center (LSC).

FWAC Visitors' Center Content will capture geologic and engineering aspects of underground construction of subsurface spaces at three locations to which Fermilab sends neutrinos.

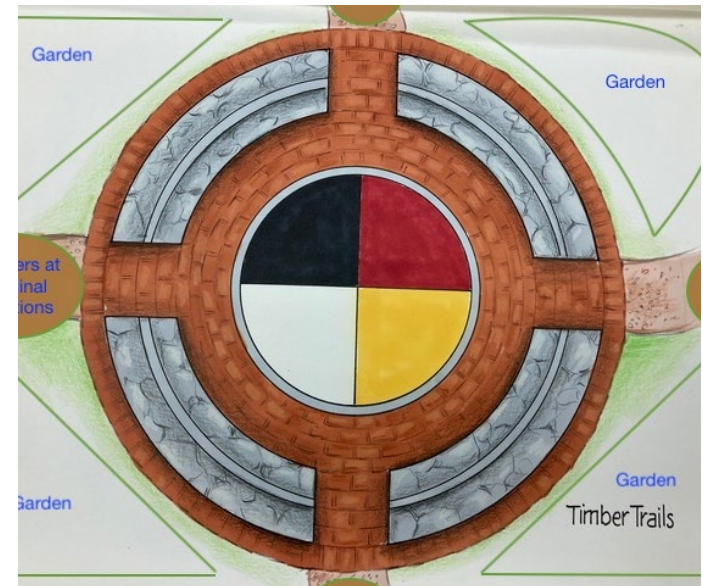
FWAC Grounds Content

The display will be a collection of fifteen to twenty-five boulders relocated to the FWAC grounds selected to demonstrate differences in rock types, mineralogy, and fossil content as well as represent Indigenous cultural aspects. The display will be applicable to both self-guided and guided walking tours. Signage will be incorporated to explain the display content.

LSC Content

Hands-on classroom/group exercises to identify rock types and minerals present in the rocks. Critical thinking exercises will be developed to design "tests" to identify certain rock types. Indigenous use of rock will also be developed for future "lab stations" within this classroom setting.

Potentially develop and Install a Medicine Wheel Garden adjacent to the boulder exhibit or outside the LSC with the development of a proposed Fermilab Land Acknowledgment Statement.



Medicine Wheel - The circle is a sacred symbol of the interdependence of all forms of life - embodies the Four Directions, as well as Father Sky, Mother Earth, and Spirit Tree—all of which symbolize dimensions of health and the cycles of life.

It guides education, health, and healing. From which all learning and teaching springs.

- Indigenous Reciprocity –Nature has identity and “gifts” are abundant, but we must reciprocate for sustainability for generations to come.



Midwest SOARRING Foundation 1996 to Present
Midwest SOARRING Foundation (Save Our Ancestors
Remains & Indigenous Resources Network Group) was formed
in November of 1996. Our mission is to offer assistance, when
asked, as a facilitator to tribes regarding repatriation issues, to
educate the public about Native American cultural issues and
environmental issues, and to build community among all people.
We also work to broaden the knowledge of about native plants
and their uses and to build a network of knowledge, plants and
seeds among different Nations. The foundation is also working
toward building a re-created working village where members,
friends and visitors can enjoy a sampling of our rich heritage.



*Save Our Ancestors Remains and
Resources Indigenous Network Group*



Native American
Cultural Center
133 W. 13th Street
Lockport, IL. 60441

Mailing Address
P.O. Box 275
Lyons, IL. 60534
773.585.8613

773.585.8613
msf@midwestsoaring.org
www.midwestsoaring.org
www.harvestpowwow.com



Summer Solstice at Churchill Woods



Building trust
Showing commitment

Land Acknowledgement Statement

- A Land Acknowledgement statement reflects the historical site contribution of Indigenous people as well as an action plan for future engagement. It will refer to how we are building an active relationship with the Indigenous community and their representation within our life science programs, particularly inclusion of their scientific wisdom knowledge, and their contributions to the physical science of Fermilab to present the Indigenous community as viable and modern and moving forward with Fermilab to begin the process of “healing”.
- To create a Land Acknowledgement Statement, the Lab, as a whole, must believe and support it and the philosophy must be reflected in the lab’s work.
- If such a statement is accepted and approved, a ceremony will be held to recognize the event

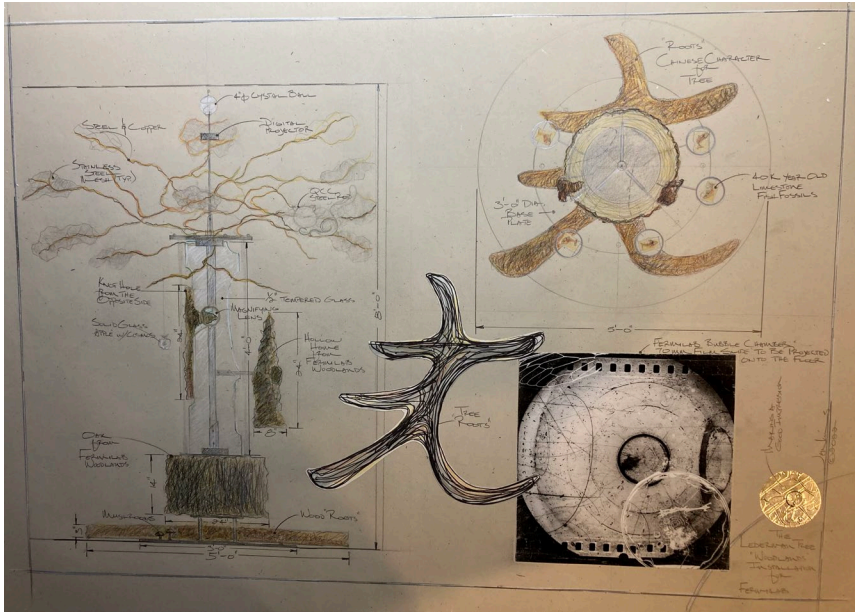
LSC Life Sciences Space Organization

- Establish 3 separate ecosystem areas that represent main areas of study and stewardship: Prairie, Wetland and Woodland
- Each ecosystem with own design, art work, ceiling design etc...
- Each ecosystem has its Centerpiece lab station that reflects authentic research of Fermilab and art exhibit i.e Indigenous mural, Georgia Schwender Quadrat art piece
- Each ecosystem integrates Indigenous contributions (past and present) and climate mitigation i.e Jorie LaFrance
- Develop year-round Community “Citizen” Science outdoor activity

Indigenous Ethnobotany – plants that are part of our prairie landscape will tell the story of culture:
sacred/traditional/medicinal



Jim Jenkins Tree Exhibit



Users:

- Students
- Teachers
- Education Facilitators
- Visitors to Lederman Science Education Center

Since its inception, Fermilab has welcomed the public to its site, highlighting the amazing intersection between **art and science**, while also serving as a National Environmental Research Park where people can explore what the Fermilab Natural Areas have to offer.

Diversity, equity and inclusion (EDI) are foundational principles of the Office of Education and Public Engagement (EPE). We recognize that communities may have different needs and will be reached through different programming and engagement. Reaching diverse audiences through **art** is an effective strategy that often touches our souls and minds in ways no other can.

Thank you!

Bison Webcam,
24/7!

