



# Status of the Neutrino Physics Center

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Physics Advisory Committee

January 9th, 2024

# PAC charge

Charge: We ask the PAC to review the activities and programs at the Neutrino Physics Center (NPC). The PAC is also asked to review the status of open recommendations from previous reviews.

1. The NPC should clearly articulate its goals, stakeholders, methods, and needs to continue to promote a rich intellectual environment in the Fermilab and broader neutrino community of today, while keeping in mind the need for evolution to the DUNE era in about 5 years.
2. The PAC would like to see a short document describing the strategic plans of the NPC

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2. The PAC would like to see a short document describing the strategic plans of the NPC (**See DUNE Host Lab Plan**)

# NPC's mission

*Foster a stimulating, neutrino-focused community, bringing together theorists and experimentalists, early-career scientists and senior researchers, visitors and Fermilab residents*

## Currently supported programs\*

NPC Fellowship Program, Neutrino University, Neutrino Seminar Series, the International Neutrino Summer School, a Neutrinos@Fermilab slack, and ad-hoc workshops

## Current coordinators



L. Koerner



P. Machado



J. Zennamo

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## **Stakeholders**

Neutrino experiments hosted at Fermilab

Neutrino Theory

Broader neutrino community (e.g. non-Fermilab)

## **Funding**

DOE User support (FWP to Intensity), Fermilab Neutrino Division

# NPC programs

\*See [last NPC presentation at the PAC](#) for more details

**NPC Fellowship Program.** Bring scientists to FNAL for stays between 2 weeks to 6 months. Support: ~\$475k yearly until covid, only \$150k in 2023.

**Neutrino University.** Series of ~10 lectures for undergrad and grad students, ~100 pp.

**Neutrino Seminar Series.** Biweekly broad neutrino-related seminars, ~100 pp.

**International Neutrino Summer School.** Two-week long, experiment and theory topics, ~150pp.

**Individual workshops**

**Neutrinos@Fermilab slack**

**Intensity Frontier Fellowship.** Longer term visits focused on broad Intensity Frontier Program (EXP and TH). Buyout from teaching. **Not managed by NPC.**

# Strategic plan for the NPC

In 2023, the **DUNE Host Lab Plan** took place

## DUNE Host Lab Plan Vol 1: Science Operations

25 May 2023

Steve Brice, Mary Convery, Maxine Hronek, Mike Kirby, Louise Suter, Patrick Weber, Bob Zwaska

This plan gave birth to the DUNE coordination office (S. Brice)

Goals was to provide a comprehensive assessment of the LBNF/DUNE science operations costs (FY22 to FY37)

# DUNE Host Lab Plan - NPC

The NPC has struggled to find sufficient funding in recent years

Build awareness of NPC:

- Work closely with spokespeople and neutrino division management to ensure good communication, Users issues and necessary tools
- Building infrastructure so NPC is their automatic first step for neutrino onboarding, including access support, seat assignments, quality of life support. [Includes admin/scientific support]
- NPC Physics/Social Hub - A check-in area for welcoming (sofas, coffee, ...)
- NPC to work closely with experimental early career groups



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**Dedicated space: discuss**  
**with management**

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As DUNE ramps up, admin support needs to increase

- One half-time admin focused on Batavia User needs and NPC fellows
- Admin support on SD User needs and located at SD.
- One full-time scientific-user-support person, focused on onboarding and computing support, plus generally access/quality of life support.
- Conference office or additional admin support during International Neutrino Summer School in 2023-2029 (odd years) and NPC computing school (first in 2024, then annually)

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\*See DUNE Host Lab Plan, pages 39-41 for more details

# NPC Computing school

\*While LPC success provides an excellent example for the NPC, the NPC is qualitatively different from the LPC, as the **NPC serves multiple experiments, and it takes place at the host lab**

There is no single software used by all collaborations.

- Art/LArSoft currently have the largest userbase.
- Focused school on Art/LArSoft, geared for early career researchers.
- Good start due to usefulness and reach
- Also serves as introduction to FNAL computing

## Plan

- NPC computing school will be modeled after the successful UK LArSoft school series, we will work together with UK School organizers
- At the DUNE collaboration meeting at CERN, both UK school organizers and DUNE Computing expressed interest in contributing to this school

Topics of UK school: Intro to FNAL computing, simulation lecture and tutorial, scintillation lecture and tutorial, intro to PANDORA, reconstruction tutorial, deep learning, ...

# NPC Journal Club

We will start an all-inclusive neutrino journal club in **February**, with broad participation from all FNAL neutrino experiments and theory. Sunny Seo is leading, together with Vishvas Pandey and the NPC coordinators

Journal club will encourage

- early career members to present papers;
- all experiments to have comparable participation;
- productive communication between experimentalists and theorists;
- low pressure environment for exchange of ideas and cross pollination.

This will be the first practical collaboration between NPC and experimental early career groups

# Diversity Equity and Inclusion

DEI plays a key role throughout all NPC managed programs:

- Key component of the NPC Fellowships
- Key component of the International Neutrino Summer School
- Community-wide seminars and lectures

NPC has applied to RENEW-HEP funding in the past and is open to new initiatives and partnerships focused on expanding DEI efforts, working together with experimental collaborations and other institutions

## Climate Surveys

- P5 recommended community-wide climate surveys, and NPC supports that
- Nevertheless, NPC is not the best venue for leading a climate survey (e.g. Users Executive Committee is broader and meets regularly with the directorate).

# Transition from multiple experiments to DUNE

As the neutrino program transitions from several neutrino experiments to DUNE, the NPC must adapt to the new setup.

- Large overlap between multiple neutrino experiments and DUNE communities
- Physics and analysis techniques will become common, enabling us to serve those needs better
- More support is needed due to larger scale of operations of DUNE
  - Two-site configuration will require admin support at the South Dakota and efficient FNAL-SD communication
  - More support for onboarding, computing and access/quality of life aspects.
  - Additional support for events (conferences, schools, workshops)

# Conclusions

The goal of the Neutrino Physics Center: *Foster a stimulating, neutrino-focused community, bringing together theorists and experimentalists, early-career scientists and senior researchers, visitors and Fermilab residents*

The NPC has been very beneficial to Fermilab and to the broad neutrino community, fostering new collaborations, ideas, and initiatives

The DUNE Host Lab Plan stipulated that for the NPC to remain impactful it will need more support as DUNE ramps up, including support at Fermilab and SD sites.

# BACKUP



# DEI in numbers

Last year's NPC fellowships

## **Region of their current institution**

US/Canada: 9

UK/Europe: 10

Mexico: 1

## **Seniority:**

Grad students: 12

Postdocs: 3

Faculty/Scientist: 5

## **Gender (based on names and/or pronouns in letters)**

Male: 15

Female: 5

We need to work on advertising the NPC Fellowship better for next calls

**International Neutrino Summer School:** ~ 40% female participation