

Overview of the Fermilab Neutrino Physics Center (NPC)

John Beacom,
(The Ohio State)

Lisa Koerner,
(U of Houston)

Joseph Zennamo,
(Fermilab)

and Steve Brice
(Fermilab)

Fermilab Summer PAC Meeting
June 6th, 2023

What is the NPC?

- Founded in 2016 with the mission to:
“foster a stimulating, neutrino-focused community, bringing together theorists and experimentalists, early-career scientists and senior researchers, visitors and Fermilab residents”
 - **Founded by Bonnie Fleming, Debbie Harris, Stephen Parke**
 - Past NPC coordinators include **Louise Suter** and **Georgia Karagorgi**
- The NPC supports several programs:
 - NPC Fellowship Program, Neutrino University, Neutrino Seminar Series, the International Neutrino Summer School, a Neutrinos@Fermilab slack, and ad-hoc workshops
- Our website can be found here: npc.fnal.gov

Who is the NPC?

- The NPC is coordinated by a team of three members from the neutrino community
 - These are selected to be a non-FNAL experimentalist, a theorist, and an FNAL-based experimentalist
- Coordinators serve for ~3 years
 - ***Huge thanks to John Beacom!***
 - ***Welcome to Pedro Machado***
- Fermilab Neutrino Division provides administrative support for our programs
 - We do not currently have tech/user support staff



**Lisa Koerner,
Non-FNAL Exp**



**John Beacom,
Theory**



**J. Z.,
FNAL Exp**



**Pedro Machado,
Theory**

How The NPC is Funded

- Every year a Field of Work Proposal is submitted to the DOE Intensity Frontier BNR to fund three programs: **Intensity Frontier Fellowship, Fermilab International Student Program, and NPC**
 - From 2018 until 2022, no funds were awarded
 - In 2023, the FWP was funded at the ~30% level
- During periods when the NPC had no explicit funding, the Fermilab Neutrino Division provided financial support so that many of our programs could continue
 - The NPC Fellowship Program was on hiatus from 2019 until this year

The NPC is deeply thankful to the Neutrino Division and the DOE for this support!

How the NPC Serves the Community

- In the next few slides, I'll talk through in detail the following programs that the NPC hosts:
 - Neutrino Physics Center Fellowships
 - Neutrino Seminar Series
 - Neutrino University
 - International Neutrino Summer School
 - Workshops
- Some of these programs existed before the NPC

Fermilab NPC Fellowships

- This program aims to bring the international neutrino community to Fermilab to engage with the neutrino community at Fermilab for short- to medium-term visits
 - Supports both experimentalists and theorists
 - Stays aim to be between 2 weeks and 6 months
 - Previously this program was supported at \$475,000 annually
 - In total, 135 scientists have come to the lab through this program
- The awards aim to bring a large cohort of 10-15 scientists biannually to the lab supporting their travel and per diem
 - It is similar in scope to the LPC “Guest & Visitor” program
- The Intensity Frontier Fellowship program offers a more prestigious award for longer-term stays at Fermilab
 - **This is not run through the NPC**

2023 NPC Fellowships!

- In 2023 we were able to secure \$150,000 in funds for the NPC Fellowship program
 - We were able to use this to put together a single call this year
- We had a solid group of 43 scientists apply and were able to fund 20 of the applications during this call
- Many of these awards are coming to work on theory, commissioning efforts (SBND & 2-by-2), and analysis topics

2023 NPC Fellows

Una Alberti

Rodrigo Alvarez Garrote

Pablo Samuel Barham Alzas

Gabriela Barenboim

Kaushik Borah

Dan Carber

Yifan Chen

Peter Denton

Rory Edwards

Panos Englezos

Stephen Greenberg

Chris Hilgenberg

Joachim Kopp

Pantelis Melas

Guadalupe Moreno Granados

Yoshikazu Nagai

Lan Nguyen

Bruno Pereira Ferrazzi

Christoph Ternes

Jure Zupan

The Neutrino Seminar Series

- Since 2013, a biweekly seminar series is held during the academic year
- Discuss topics of interest to the neutrino community
 - Try to have a topics the extend beyond Fermilab's standard focus
- The seminar series is very popular in the community
 - Generally have 100 total participants with ~70 via zoom

2023 Neutrino Seminar Organizers



**Asli
Abdullahi**



**Vincent
Basque**



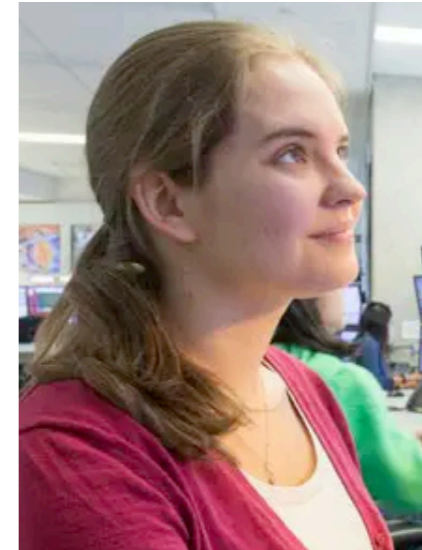
**Jacob
Zetlemoyer**



***Talk on Canadian Nuclear Lab
Noble Liquid R&D Program***

Neutrino University

2022 Organizers



Lauren Yate



Ryan Plestid

2023 Organizers



Innes Bigaran

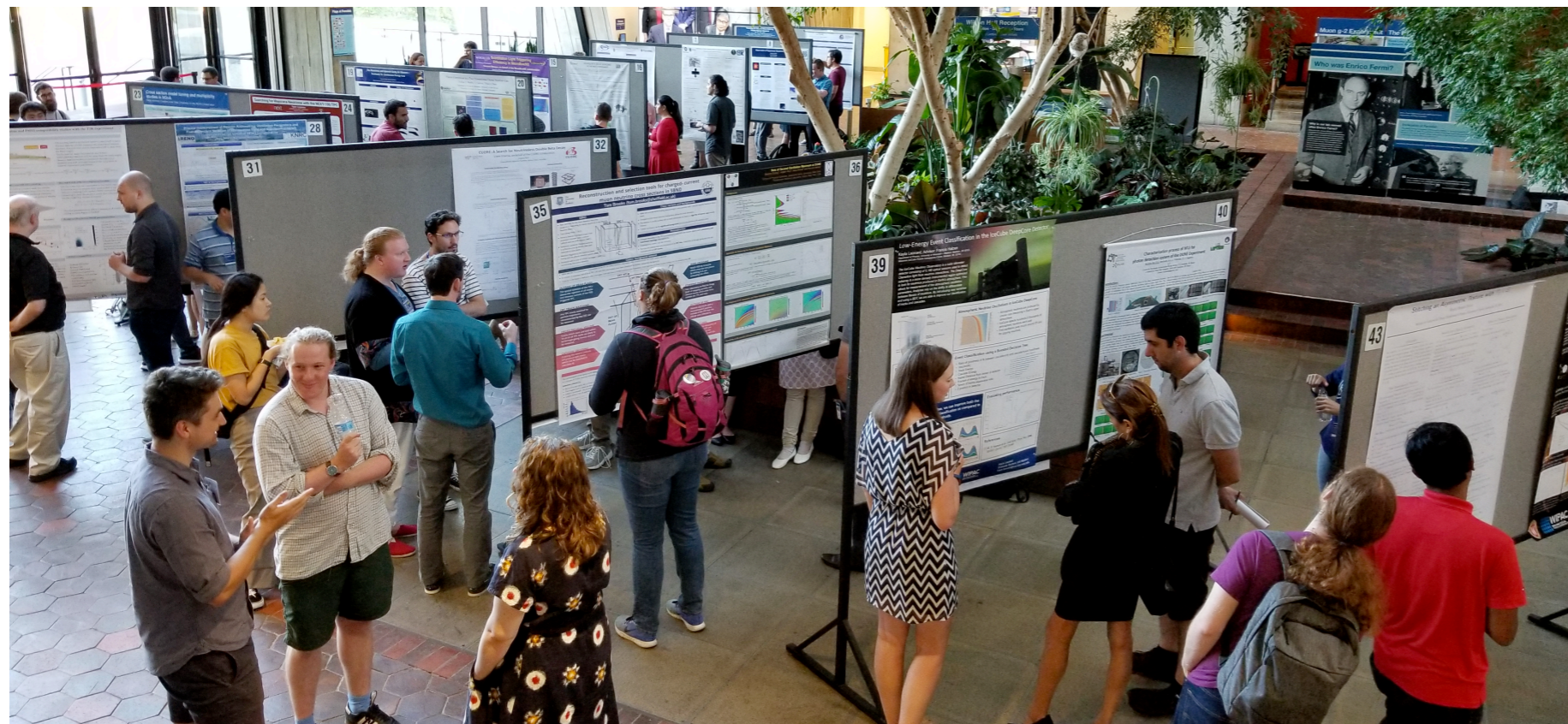


Teresa Lackey

- Every summer since 2014, the NPC hosts a summer neutrino seminar series for undergrad & graduate scientists
- Topics range from an introduction to neutrino physics, neutrino detectors, to the physics associated with different neutrino sources
 - ~10 lectures from June to August when there is a larger onsite community
- This is a hugely popular program that draws in 50-100 participants for every seminar

International Neutrino Summer School

- Every year, in concert with the International Neutrino Commission, a two-week summer school is hosted as a “crash course” in neutrino physics
- The location cycles between being hosted at Fermilab and being hosted in conjunction with the biannual Neutrino conference location
- This is a hugely popular program that most senior and junior members of the community participated in during their career



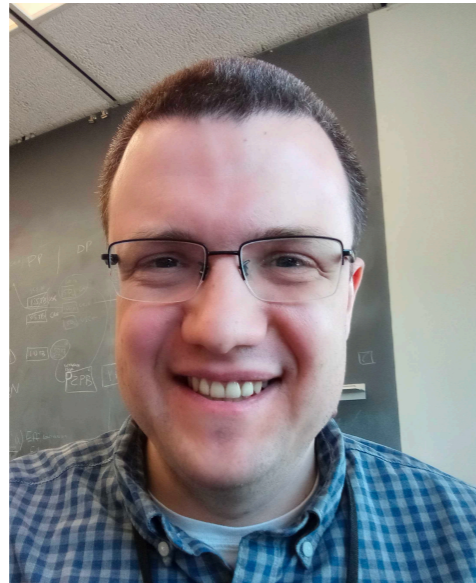
***2019 INSS
Poster Session***

2023 INSS

2023 International Neutrino Summer School Local Organizing Committee



Minerba Betancourt, *Chair*



Steven Gardiner



Vishvas Pandey



Ryan Plestid



Tingjun Yang

14th International Neutrino Summer School at the Fermilab NPC
07–19 August 2023

The International Neutrino Summer School provides training for the next generation of neutrino physicists in both theory and experiment. The school brings together graduate students and postdocs, along with some of the best teachers and researchers in neutrino physics. It provides an intense, two-week-long learning experience in an open and interactive environment that covers the full range of modern neutrino physics.

Registration and other information at: indico.fnal.gov/event/57378

International Advisory Committee
Pilar Coloma, Madrid, IFT
Kirsty Duffy, University of Oxford
Gabriel Orellana Garm, UC Berkeley
Daniel Green, UC San Diego
Cecilia Lunardini, Arizona State University
Pedro Machado, Fermilab
Jason Newby, Oak Ridge National Laboratory
Luis Alvarez-Ruso, Valencia, IFIC
Thomas Schwetz, Karlsruhe Institute of Technology
Michael Wurm, Mainz University

Local Organizers
Minerba Betancourt, Chair
Steven Gardiner
Vishvas Pandey
Ryan Plestid
Tingjun Yang

- Will be hosted at Fermilab in early August!
- ~150 students have registered to participate in the two-week school!

Future Areas Of Growth

- Software Workshops
 - In the past, the NPC host three ad-hoc workshops on various neutrino topics, these activities have been impacted by funding challenges
 - Looking forward the NPC would like to expand to hosting software and analysis workshops for LArTPC collaborations, partnering with the highly successful “LArSoft Workshop” series hosted annually in the UK
- Coordinate with Neutrino Early Career Groups
 - As a community organization it is important that the NPC understands the needs of that community
 - We are looking to find a way to partner with the various experimental early career organizations to hear from them about how we can better serve them
- Need to understand how we can support the community in South Dakota during construction, commissioning, and operations

DUNE construction will begin soon with a large growth of the Fermilab Neutrino community, the NPC will need to grow to support this growth

Services Not Currently Supported

- Computing, User, and Onboarding Support
 - Experiments independently deal with these issues with a significant amount of redundancy
 - The LPC has a dedicated person who helps with this for CMS
 - A similar model could work in the future as the NPC becomes epicenter for DUNE activities in the US
- Physical meeting space and social hub
 - This highly impacts the NPC's "brand recognition" being that there is no "center" where members of the neutrino community can gather

The NPC would love to support this, but our funding doesn't currently allow us to offer these services!

Challenges of Campus Access

- The neutrino community continues to find working at Fermilab challenging due to campus access
- A clear example of this was the recent DUNE collaboration meeting held at Fermilab from May 22 - 25th
- A survey of all participants was made where:
 - It was impossible for 8% of respondents to attend the meeting due to access issues
 - 43% of respondents were unable to get a badge while at the lab
 - 33% experienced issues getting onsite
 - 25% said they were unlikely to attend future Fermilab based on these issues
 - **This burden fell predominantly on early-career members of the collaboration**
- A common facetious comment heard throughout the meeting was: “some host lab...”
 - Fermilab is the host laboratory of the DUNE collaboration