

NuSTEC Cross Experiment Working Group Update



Afro for the CEWG committee members

CEWG Organization

Goal: The goal of the NuSTEC CEWG is to provide a service to the neutrino-nucleus interaction community by aiding communication between experiments, and building consensus on how to best perform and report cross section measurements.

Page: <https://nustec.fnal.gov/cross-experiment-working-group-cewg/>

Conveners

**Daniel
Cherdack**



**Vishvas
Pandey**



**Afro
Papadopoulou**



Members

**Prabhjot
Singh**



**Luca
Doria**



**Josie
Paton**



Member representatives from major experiments: (T2K, NOvA, MINERvA, MicroBooNE, SBND, ICARUS, DUNE, and electron scattering)

Meetings and Communications

- Monthly seminars:
 - First “working” Thursday of each month at 10:00 CT for roughly 90 minutes
 - 45 min presentations + 45 min of “Deep dive” discussion followed by the seminar
 - Recording of seminars
 - Rotate through experiments
 - Identify topics of interest to cross section experts
- Communication:
 - CEWG committee members meetings to discuss plans for inviting speakers and topics of interests
 - Slack channel on the NuSTEC workspace (for conveners and representatives)
 - Email list (open to all)
 - Indico folder (meeting pages)
 - Page on NuSTEC website

Arranging Seminars Since 2020

2024

- December 5, 2024: "OmniFold: Machine Learning-Assisted Unfolding", Andrew Cudd (University of Colorado Boulder)
- November 7, 2024: "Data-driven Model Validation For Neutrino Cross Section Measurements", Lee Hagaman (University of Chicago)
- October 17, 2024: Joint CEWG + CTGWG Event
"2p2h from the Valencia Model Revisited", Joanna Sobczyk (Joliot-Curie Curie Institute)
- October 3, 2024: "Current Status of Achilles Event Generator", ,
- September 12, 2024: "New proton transparency data with electrodynamics", Dytman (University of Pittsburgh)
- August 15, 2024: "Neutrino-nucleus interaction systematic uncertainties", (CERN)
- June 13, 2024: "Measurement of double-differential cross sections for argon with final-state protons using the MicroBooNE detector",
- March 7, 2024: "Measurement of Transverse/Generalized Kinematics", Furmanski (University of Minnesota), Afroditi Papadopoulou (Argonne National Laboratory)
- January 18, 2024: "NuHepMC: A Standardized Event Record For Neutrino Simulations", Joshua Isaacson (Fermilab), Luke Pickering (STFC, Rutherford Appleton Laboratory)

2022

- March 3, 2022: "Electrons for Neutrinos", Adi Ashkenazi (Massachusetts Institute of Technology), Afroditi Papadopoulou (Massachusetts Institute of Technology)

2021

- December 2, 2021: "Data Unfolding with the Wiener-SVD Method", Hanyu Wei (Brookhaven National Laboratory), Wenqiang Gu (Brookhaven National Laboratory), Xin Qian (Brookhaven National Laboratory)
- "Further Applications of the Additional Smearing Matrix", Lukas Koch (University of Oxford)
- June 3, 2021: "SBND-PRISM: Sampling Multiple Off-Axis Fluxes with the Same Detector", Marco Del Tutto (Fermilab), Vishvas Pandey (University of Florida)
- April 8, 2021: "The T2K Method for Cross Section Extraction", Andrew Cudd (University of Colorado Boulder), Ciro Riccio (Stony Brook University), Ka Ming Tsui (University of Liverpool), Stephen Dolan (CERN)
- March 4, 2021: "Comparing Data to Generators: Examples from NOvA Cross-section Measurements", Mathew Muether (Wichita State)

2020

- December 3, 2020: "MicroBooNE: CC Interactions with at Least One Proton and No Pions in the Final State", Andrew Furmanski (University of Minnesota)
- November 2, 2020: "Flux Shape Uncertainties", Lukas Kock (Oxford University), Stephen Dolan (CERN)

Topics covered since last board meeting

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“Measurement of double differential charged current muon neutrino scattering in three-momentum transfer and available energy using the NOvA Near Detector”, Travis Olson (University of Houston)
- October 3, 2024: “Current Status of Achilles Event Generator”, Joshua Isaacson (Fermilab)
- September 12, 2024: “New proton transparency data with electron probe and its relationship to neutrino experiments”, Steven Dytman (University of Pittsburgh)
- August 15, 2024: “Neutrino-nucleus interaction systematic uncertainties and baseline model for DUNE analyses”, Laura Munteanu (CERN)

Joint event with CTGWG and plans to hold more joint events in the future

Plans for 2025

- Steven Dolan will be giving the January talk on the T2K Neutrino Interactions Model
- Lots of ideas for the following seminars & proposed speakers after brainstorming session with proposed speakers/contact people and in the CEWG committee

Hypothesis tests and model parameter estimation on data sets with missing correlation information [Feb 6?]	https://arxiv.org/abs/2410.22333	Lukas Koch
Detector Systematics (uboone +t2k) [March 6?]		Lauren Yates (uboone), Sasha (Alexander Izmaylov) or Sophie (King)
uboone CC2p [April 3?]		Dan Barrow
SPINE ML reco		Mike Mooney and/ or Kazu
Profit, gundam		Mark RL/Gray Putnam
T2K pion measurements		Sam, Greg, Rowan
NOvA tuning model		Bryan Ramson
Flux	https://arxiv.org/pdf/2410.23098	Lots of ideas; needs refinement, possibly multiple topics
Cosmic Overlays		
HEP Data Releases and Analysis Preservation		Luke P

Aspirational Goals for 2025

Already very good candidates for 2025!

We would further like to

- encourage attendance from younger collaborators directly involved in the efforts related to CEWG seminars
we intend to directly reach out to spokes and analysis coordinators of experiments to identify the relevant collaborators
- use the nustec general slack channel for questions and further discussions with members of the community
[thoughts are welcome!]
- recognize CEWG member contributions in the form of “CEWG committee”
- facilitate more engagement during discussion time [set of questions from seminar chair to kick off the discussion ?]

Thank you!

Back up

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Cross Experiment Working Group

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Members: Luca Doria, Josephine Paton, and Prabhjot Singh

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