NuSTEC Outreach Working Group Update

T.Katori (King's College London)
A.Papadopoulou (ANL)

Outreach Working Group

Conveners: Teppei Katori and Afroditi Papadopoulou

The outreach group focuses on enhancing NuSTEC's and community-wide neutrino interaction physics activities' outreach to and engagement with the broader neutrino and scientific community as well as with science enthusiasts.

To Follow NuSTEC activities:

- Subscribe to the "NuSTEC News" mailing list
  Send an email to listserv@fnal.gov
  Leave the subject line blank
  Type "subscribe nustec-news firstname lastname" (without the quotation marks) in the bodyYou can also
  view the email archive
- Like and follow NuSTEC News Facebook page
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- Listserv: NuSTEC-News (~600 subscribers)

- Advertise nuxsec workshops/schools/conferences
- Advertise NuSTEC WG activities
- Recent results

- NuSTEC News Facebook page

- Highlight nu-xsec related activities
- Community engagement

NUSTEC-News
Published by Afroditi Papadopoulou
· 6 days ago · 🌐

We would like to bring your attention to a new manuscript (arXiv:2412.07466) on the "Implementation and investigation of electron-nucleus scattering in NEUT neutrino event generator".

Abstract
Understanding nuclear effects is essential for improving the sensitivity of neutrino oscillation measurements. Validating nuclear models solely through neutrino scattering data is challenging due to limited statistics and the broad energy spectrum of neutrinos. In contrast, electron s... **See more**

ARXIV.ORG
Implementation and investigation of electron-nucleus scattering in NEUT neutrino event generator

NUSTEC-News
Published by Afroditi Papadopoulou 🌐 · 4 days ago · 🌐

Second neutrino interaction session at Neutrino2024 with talks from MicroBooNE, ENUBET, e4v, CEvNS, and COHERENT!
https://agenda.infn.it/event/37867/timetable/...

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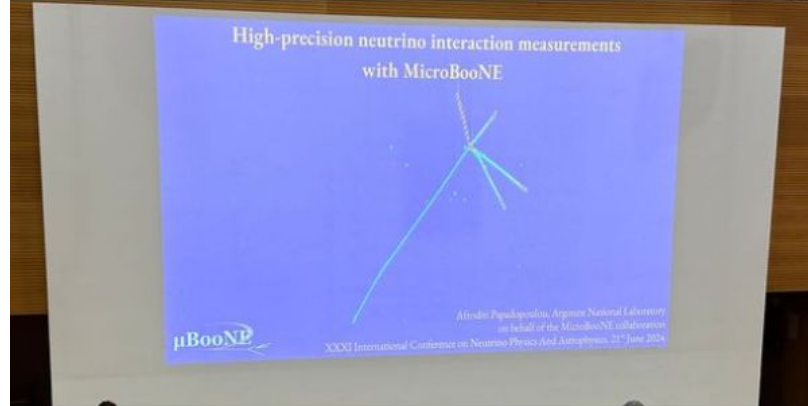
- Experiment slack (e.g. CEWG seminars)

Afroditi Papadopoulou 8:27 AM

Dear NuSTEC colleagues,

We will have our next NuSTEC Cross Experiment Working Group (CEWG) Seminar on Thursday, December 5 at 10:00 am US Central Time.

Speaker: Andrew Cudd
Topic: OmniFold: Machine Learning-Assisted Unfolding
Abstract: The choice of unfolding method for a cross-section measurement is tightly coupled to the model dependence of the efficiency correction and the overall impact of cross-section modeling uncertainties in the analysis. A key issue is the dimensionality used, as the kinematics of all outgoing particles in an event typically affects the reconstruction performance in a neutrino detector. OmniFold is an unfolding method that iteratively reweights a simulated dataset using machine learning to utilize arbitrarily high-dimensional information that has previously been applied to collider and cosmology datasets. Here, we demonstrate its use for neutrino physics using a public T2K near detector simulated dataset, and show its performance is comparable to or better than traditional approaches using a series of mock data sets.

Resources:
OmniFold Paper: https://doi.org/10.1103/PhysRevLett.124.182001
Neural network weighting: https://journals.aps.org/prd/abstract/10.1103/PhysRevD.101.091901

Indico page:https://indico.fnal.gov/event/67192/

Zoom link:https://fnal.zoom.us/j/95572357669?pwd=2pLvnstvP2viuQfacTpN63QmC5r2kv.1

Meeting ID: 955 7235 7669
Passcode: 999143

For those at Fermilab, we have reserved the Refuge Chamber (WH13SW)

You can find slides and recordings of our past seminars, and a list of upcoming seminars on our webpage: https://nustec.fnal.gov/cross-experiment-working-group-cewg/

Regards,

- NuSTEC site

Cross Experiment Working Group

Conveners: Dan Cherdack, Vishvas Pandey, and Afroditi Papadopoulou

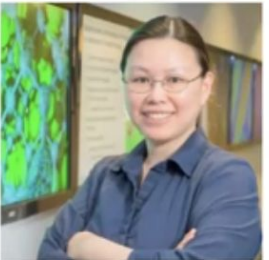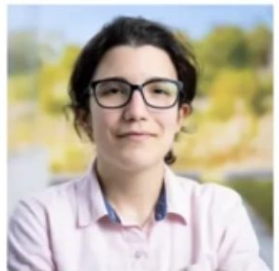**Members**: Luca Doria, Josephine Paton, and Prabhjot Singh

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.

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 (Johannes Gutenberg University Mainz)
  "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)
- June 13, 2024: "Measurement of double-differential cross sections for mesonless charged-current muon neutrino interactions on argon with final-state protons using the MicroBooNE detector", Steven Gardiner (Fermilab)
- March 7, 2024: "Measurement of Transverse/Generalized Kinematic Imbalance Variables in MicroBooNE", Andrew Furmanski (University of Minnesota), Afroditi Papadopoulou (Argonne National Laboratory)
- January 18, 2024: "NuHepMC: A Standardized Event Record Format for Neutrino Event Generators", Steven Gardiner (Fermilab), Joshua Isaacson (Fermilab), Luke Pickering (STFC, Rutherford Appleton Laboratory)

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Targeting candidate SULI students. A number of them reached out and expressed interest in cross section & generator projects at FNAL and ANL in the summer

Thank you!