Jyoti Tripathi
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Working as a Research Associate at Physics department, Panjab University, Chandigarh since August 2019. Conducting research in Experimental High Energy Physics, working mainly on the NOvA long baseline neutrino oscillation experiment.

## Education

Ph.D. in Experimental High Energy Physics, Panjab University, Chandigarh (2020)
MSc Physics, University of Delhi, Delhi
BSc (Hons) Physics, University of Delhi, Delhi

## Research Experience

### Panjab University (July 2018 - present)

Set up the first Remote Operation Center (ROCs) in India for taking shifts for NOvA Experiment
Mentoring graduate students on the use of software tools for data analysis in the neutrino experiments
Working in the Near Detector Physics group for charged pion cross section analysis.
Exploring deep learning frameworks including TensorFlow, Caffe

### Fermilab (December 2014 - June 2018)

Worked with the NOvA experiment that detects the neutrinos and looks for their oscillation as they travel from near to far detector sites of the experiment.

**NuMI Beamline Simulations** One of the leading members of the neutrino beam simulations group from 2015 to 2018. Worked on FLUGG package that interfaces the Geant4 geometry with FLUKA physics interactions.
Worked on the optimization of the off-axis neutrino flux production by improving the focusing of the neutrino parents for NOvA experiment.
Did detailed simulation of the existing NuMI beamline components, studying the impact of neutrino production target length, the position of the magnetic focusing horns on the overall neutrino flux.
Modified the configuration of the beamline components including the insertion of additional focusing horn in Geant4 geometry based on simulations results and assessed the neutrino flux prediction.

**Data Analysis** Worked on the physics data analysis with the NOvA experiment. One of the main analyzers of the charged current reaction channel for the cross section measurements of charged pion production in the NOvA Near Detector situated at Fermilab. Using Convolutional Visual Network (CVN) for particle and event identification. Was involved in validating the performance of the CVN as compared with the traditional algorithms being used by the group. Developed an energy estimator for charged pions in the Near Detector using calorimetric energy information.

**NOvA Shifts and Detector Maintenance** Took NOvA Control Room Shifts. Responsible for producing

comprehensive weekly status updates concerning the NOvA Far Detector and its hardware.

**Panjab University (January 2013 - December 2014)**

Learnt handling of gas detectors (mainly leakage testing) and scintillation counters, soldering of wire frames of different shape and manufacturing the wire frames using wire winding machine, stretching and gluing of mylar foils, making cables using lemo connector and D-connector and usage of current and charge sensitive preamplifier, amplifier and Analog to Digital Converter (ADC).
Did sensitivity studies for various experiments including NOvA, T2K using GLoBES which is a software tool for the simulation of long baseline neutrino experiments.

## Invited Presentations and Posters

- National Webinar Series on Machine Learning, Panjab University, Chandigarh July 2020
  *Introduction to Machine Learning (talk)*

- DUNE Near Detector Discussion Meeting, TIFR, Mumbai February 2020
  *Active element : Technology choices for the Muon System in DUNE ND (talk)*

- Python Workshop, Panjab University, Chandigarh March 2019
  *Convolutional Visual Network using Python (talk)*

- DAE-BRNS High Energy Physics Symposium, IIT, Chennai, December 2018
  *Status of Charged Pion Production measurement in NOvA Near Detector (talk)*

- American Physical Society (APS) Meeting Columbus, Ohio, April 2018
  *Status of Charged Pion Production measurement in NOvA Near Detector (talk)*

- Division of Particles and Fields (DPF) Meeting Fermilab, August 2017
  *NOvA Target and Horn Configuration Simulation (poster)*

- New Perspectives Meeting, Fermilab June 2017
  *Charged Pion Production measurement in NOvA Near Detector (talk)*

- 11th International Workshop on Neutrino-Nucleus Scattering in Few-GeV Region, Toronto June 2017
  *Status of Charged Pion Production measurement in NOvA Near Detector (poster)*

- Users Meeting at Fermilab June 2016
  *Measurement of the Neutral Current neutral pion Production Cross section with the NOvA Near Detector (poster)*

- Users Meeting at Fermilab June 2015
  *NOvA Target Study with G4NuMI and FLUGG (poster)*

# Publications

## Major Contributions

- Technical Note on "NuMI off Axis Beam Studies for NOvA", Part I with John Cooper, Giulia Brunetti and Daisy Kalra.

- Second Technical note "NuMI off Axis Beam Studies for NOvA", Part II with John Cooper, Giulia Brunetti and Daisy Kalra.

- DPF Proceeding for the poster "NuMI Target and Horn Simulations Study", arxiv.org/abs/1710.03699

- DAE Proceeding (in progress) for the talk showing the status of the charged pion analysis using CVN.

**Collaboration Papers**

- Acero, M.A. et al., (NOvA Collaboration), First measurement of neutrino oscillation parameters using neutrinos and antineutrinos by NOvA, Published in Phys. Rev. Lett. 123, 151803 (2019)

- Acero, M.A. et al., (NOvA Collaboration), Observation of seasonal variation of atmospheric multiple-muon events in the NOvA Near Detector (2019), arXiv:1904.12975v1

- Acero, M.A. et al., (NOvA Collaboration), Measurement of Neutrino-Induced Neutral-Current Coherent pi0 Production in the NOvA Near Detector (2019), arXiv:1902.00558v2.

- Acero, M.A. et al., (NOvA Collaboration), New constraints on oscillation parameters from nue appearance and numu disappearance in the NOvA experiment, Phys. Rev. D 98, 032012 (2018).

- P. Adamson et al., (NOvA Collaboration), Search for active-sterile neutrino mixing using neutral-current interactions in NOvA, Published in Phys.Rev.Lett. 96, 072006 (2017).

- P. Adamson et al., (NOvA Collaboration), Constraints on Oscillation Parameters from nu_e Appearance and nu_mu Disappearance in NOvA , Published in Phys.Rev.Lett. 118 (2017) no.23, 231801.

- P. Adamson et al., (NOvA Collaboration), Measurement of the neutrino mixing angle theta_23 in NOvA , Published in Phys.Rev.Lett. 118 (2017) no.15, 151802.