Curriculum Vitae

Yongbin Feng

Batavia, Illinois, 60510 Email: yfeng@fnal.gov

PROFESSIONAL POSITIONS

- **Fermi National Accelerator Laboratory**, Batavia, Illinois, USA
  Postdoctoral Research Associate, Nov. 2020 - Present

EDUCATION

- **University of Maryland, College Park**, College Park, Maryland, USA
  Ph.D. in Physics, Aug. 2015 - Oct. 2020
- **University of Science and Technology of China**, Hefei, Anhui, China
  B.S. in Physics, Aug. 2011 - Jun. 2015

PROFESSIONAL EXPERIENCE

- Feb. 2021 - Ongoing, CMS Machine Learning Production Group L3 Convener

RESEARCH EXPERIENCE

- Dec. 2020 - Present

  Measurement of the inclusive and differential W and Z cross sections
  - Probe the precise measurement of the inclusive W and Z cross section, and their ratios, at 13 TeV using the low pileup dataset
  - Probe the measurement of the differential W production cross section with respect to the boson p_{T}
- Nov. 2020 - Present

  SONIC: Service for Optimized Network Inference with Coprocessors
  - Convert the direct inference producers in CMSSW into SONIC producers; test and validate the inference speedups during the product tests
  - Work on non-ML custom backend to port GPU algorithms in CMSSW into SONIC versions to be run as a Service
- Nov. 2020 - Present

  DarkQuest: probing the light dark matter with proton-fixed target experiment
  - Set up and maintain the simulation framework and analysis chain; help graduate students and undergraduate students conduct DarkQuest researches
  - Simulate and understand the performance and impacts of the Electromagnetic Calorimeter (EMCal)
  - Collaborate with the SpinQuest collaboration; study the displaced track and vertex reconstruction algorithm and performances
- Apr. 2019 - Sep. 2019

  Installation of the CMS Hadronic Calorimeter (HCAL) Barrel Upgrade
  - Test and installation of the read-out modules and electronics for the barrel upgrade of the HCAL subdetector.
- Oct. 2018 - Nov. 2020

  DeepMET development and W recoil studies

  - Development and calibration of the deep-learning based missing transverse momentum estimator (DeepMET), with better resolutions than PF and Puppi MET, and more robustness against pileup.
  - Application of DeepMET in the recoil measurement of the W boson, in order to reduce the uncertainties of the W mass measurement from the W transverse momentum spectra.

- Jan. 2018 - Ongoing

  Search for new particles in the $W\gamma$ final state
  - Search for new particles in the $W\gamma$ final state, where W decays leptonically, using full Run-II data collected by CMS.
  - Work on the parametric modelings of signal and backgrounds, systematic uncertainty evaluations and limit settings.

- Oct. 2016 - Feb. 2019

  Search for emerging jets
  - Search for the "dark QCD" model with the "emerging jet" signatures, using 2016 data collected by CMS.
  - Study of "emerging jet" tagging variables, event selection criteria, and background estimations.

- Jan. 2016 - Jan. 2018

  Radiation damage study of plastic scintillators
  - Study of scintillator light yields for different materials, using cosmic ray, radioactive sources, and spectrophotometer.
  - Study of the HCAL Endcap radiation damage modeling, including total dose, dose rate, temperature dependence and other effects during recovery.

- Jun. 2014 - Jul. 2015

  Study of $e^+e^- \to K^+K^-\pi^+\pi^-$ process
  - Measurement of the cross section of $e^+e^- \to K^+K^-\pi^+\pi^-$ with the BESIII detector.
  - Search for possible tetraquark states in this process.

PUBLICATIONS

- C. Papageorgakis et al., *Dose rate effects in radiation-induced changes to phenyl-based polymeric scintillators*, 2203.15923
- P. Harris et al., *Physics Community Needs, Tools, and Resources for Machine Learning*, in *2022 Snowmass Summer Study*, 3, 2022, 2203.16255
- T. Li et al., *Semi-supervised Graph Neural Networks for Pileup Noise Removal*, 2203.15823
- A. Apyan et al., *DarkQuest: A dark sector upgrade to SpinQuest at the 120 GeV Fermilab Main Injector*, 3, 2022, 2203.08322
- CMS collaboration, *Search for new particles decaying to a jet and an emerging jet*, *JHEP* **02** (2019) 179 [1810.10069]

SEMINARS, CONFERENCE TALKS, POSTERS

- *DarkQuest - Probing dark sector with a proton fixed-target experiment at Fermilab*
  Seminar presented at the SYSU-PKU Particle Physics Forum, Virtual, May 2022.
- *Semi-supervised graph neural network for pileup noise removal*
  Talk presented at University of Washington Machine Learning Forum, Virtual, May 2022.
- *DarkQuest - Searching for light dark matter with a proton fixed-target experiment at Fermilab*
  Talk presented at the 2022 Phenomenology Symposium, Pittsburgh, Pennsylvania, USA, May 2022.

- *Semi-supervised machine learning for pileup per particle identification with graph neural networks*
  Talk presented at the 2021 BOOST workshop, Virtual, August 2021.
- *Searching for light dark matter at Fermilab's proton-fixed target experiment: DarkQuest*
  Talk presented at the 2021 Particle Physics and Cosmology Workshop, Norman, Oklahoma, USA, May 2021.
- *Search for emerging jets and other long-lived states with the CMS experiment*
  Seminar presented at Experimental particle physics seminars of University of Pennsylvania, Philadelphia, Pennsylvania, USA, November 2019.
- *Search for new particles decaying into a jet and an emerging jet*
  Poster presented at the 2019 Winter LHCC meeting Students Poster Session, CERN, Geneva, Switzerland, February 2019.
- *Search for New Physics with Emerging Jets*
  Talk presented at the 2018 APS April Meeting, Columbus, Ohio, USA, April 2018.

TEACHING EXPERIENCE

- *Lead Facilitator*, Top mass measurement long exercise of CMSDAS 2022, Fermilab, January 2022
- *Lead Facilitator*, Inference Hands-on session of the CMS Machine Learning Town Hall, CERN, July 2021
- *Facilitator*, Machine Learning HATs of the LPC HATs, Fermilab, July 2021
- *Facilitator*, HH($b\bar{b}b\bar{b}$) long exercise of CMSDAS 2021, Fermilab, January 2021
- *Lead Facilitator*, MET short exercise of CMSDAS and LPC HATS, Fermilab, January 2021, July 2021, January 2022
- *Teaching Assistant*, PHYS276 Electronics Lab, 3 classes, about 40 students, Maryland, Fall 2015
- *Teaching Assistant*, Introduction to Electromagnetism, about 80 students, USTC, Spring 2015

SCHOLARSHIPS

- National Endeavor Scholarship, USTC, 2013
- Industrial Responsibility Scholarship, USTC, 2012