

Fair Universe HiggsML Uncertainty Challenge

Monday, November 4, 2024 5:00 PM (20 minutes)

The Fair Universe project is organising the HiggsML Uncertainty Challenge, which has been running from Sep 2024 to 14th March 2025. It is a NeurIPS 2024 competition.

This HEP and Machine Learning competition is the first to strongly emphasise uncertainties: mastering uncertainties in the input training dataset and outputting credible confidence intervals.

The context is the measurement of the Higgs to tau+ tau- cross section like in HiggsML challenge on Kaggle in 2014, from a dataset of the 4-momentum signal state. Participants should design an advanced analysis technique that can not only measure the signal strength but also provide a confidence interval, from which correct coverage will be evaluated automatically from pseudo-experiments.

The confidence interval should include statistical and systematic uncertainties (concerning detector calibration, background levels, etc...). It is expected that advanced analysis techniques that can control the impact of systematics will perform best, thereby pushing the field of uncertainty-aware AI techniques for HEP and beyond.

The challenge is hosted on Codabench (an evolution of the popular Codalab platform); the significant resources needed (to run the thousands of pseudo-experiments needed) are possible thanks to using NERSC infrastructure as a backend.

Fair Universe NeuIPS whitepaper
competition site

Track

Tagging (Classification)

Authors: GHOSH, Aishik (University of California Irvine (US)); NACHMAN, Ben (Lawrence Berkeley National Lab. (US)); HARRIS, Christopher (Unknown); ROUSSEAU, David (IJCLab-Orsay); Mr ULLAH, Ihsan (Chalearn); GUYON, Isabelle; DUDLEY, Jordan (Berkeley); CALAFIURA, Paolo (Lawrence Berkeley National Lab. (US)); Mr NUGENT, Peter (Berkeley); CHAKKAPPAL, Ragansu (IJCLab-Orsay); DIEFENBACHER, Sascha (Lawrence Berkeley National Lab. (US)); HSU, Shih-Chieh (University of Washington Seattle (US)); FARRELL, Steven (Lawrence Berkeley National Laboratory); BHIMJI, Wahid; CHOU, Yuan-Tang (University of Washington (US)); ZHANG, Yulei (University of Washington, Seattle)

Presenter: CHAKKAPPAL, Ragansu (IJCLab-Orsay)

Session Classification: Mixed contributions