

# DIS2023: XXX International Workshop on Deep-Inelastic Scattering and Related Subjects



Contribution ID: 143

Type: **Parallel talk**

## On the determination of uncertainties in parton densities

*Wednesday, 29 March 2023 09:00 (20 minutes)*

We review various methods used to estimate uncertainties in quantum correlation functions, such as parton distribution functions (PDFs). Using a toy model of a PDF, we compare the uncertainty estimates yielded by the traditional Hessian and data resampling methods, as well as from explicitly Bayesian analyses using nested sampling or hybrid Markov chain Monte Carlo techniques. We investigate how uncertainty bands derived from neural network approaches depend on details of the network training, and how they compare to the uncertainties obtained from more traditional methods with a specific underlying parametrization. Our results show that utilizing a neural network on a simplified example of PDF data has the potential to inflate uncertainties, in part due to the cross-validation procedure that is generally used to avoid overfitting data.

### Submitted on behalf of a Collaboration?

No

### Participate in poster competition?

No

**Primary authors:** ACCARDI, Alberto (Hampton U. and Jefferson Lab); THOMAS, Anthony; WHITE, Martin John (Adelaide U.); HUNT-SMITH, Nicholas; SATO, Nobuo; MELNITCHOUK, Wally (Jefferson Lab)

**Presenter:** ACCARDI, Alberto (Hampton U. and Jefferson Lab)

**Session Classification:** WG 1

**Track Classification:** WG1: Structure Functions and Parton Densities