

## Phenomenology 2025 Symposium



Contribution ID: 150

Type: **not specified**

# The bias-variance-correlation tradeoff and its implications for ML applications in HEP

*Monday 19 May 2025 14:30 (15 minutes)*

The bias-variance tradeoff is a well-recognized phenomenon in statistics and machine learning. In this talk, I will discuss an extension, dubbed the bias-variance-correlation tradeoff. Roughly speaking, as the flexibility of a model decreases, the correlations in the outputs of a trained model for different inputs increases. Such correlations have implications for several applications of machine learning in high energy physics, e.g., the use generative models for event generation. In particular, I will argue that claims in the literature of data amplification by generative models stem from ignoring important correlations between the model's outputs for different inputs.

## Mini Symposia (Invited Talks Only)

## Plenary (Invited talks only)

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**Session Classification:** Machine Learning

**Track Classification:** Machine Learning and Artificial Intelligence in Particle Physics