Contribution ID: **31**   Type: **Oral**

The Assessment of Different VAE derivatives for Data Generation and Event Classification in Zγ Final State Background Data

Data generation and event classification are crucial and resource-intensive processes in high energy physics searches at the LHC. Deep learning methodologies are being increasingly adopted as alternative methodologies to traditional data generation and event classification mechanisms to increase efficiency, accuracy and resource demand. In this work, a Variational Auto-encoder (VAE) and derivatives; Variational Auto-encoder plus Discriminator (VAE+D), Variational Auto-encoder plus Normalising Flows plus Discriminator (VAE+NF+D), Copula Variational Auto-encoder (CVAE) and Copula Variational Auto-encoder plus Discriminator (CVAE+D) are assessed as both data generators and event (signal) classifiers for use with Zγ final state background data. These VAE derivatives are trained on Monte Carlo simulated Zγ final state background data to be able to generate new data and classify data which is not recognised as training data.

Primary author: STEVENSON, Finn (University of the Witwatersrand, CERN)

Co-author: MELLADO, Bruce (University of the Witwatersrand and iThemba LABS)

Presenter: STEVENSON, Finn (University of the Witwatersrand, CERN)