

## Connecting The Dots 2023



Contribution ID: 35

Type: **Plenary**

# Study of a new algorithm for tracker alignment using Machine Learning

*Wednesday 11 October 2023 14:30 (25 minutes)*

For the tracker systems used in experiments like the large LHC experiments, a track based alignment with offline software is performed. The standard approach involves minimising the residuals between the measured and track-predicted hits using the  $\chi^2$  method. However, this minimisation process involves solving a complex and computationally expensive linearised matrix equation. A new approach utilising modern Machine Learning frameworks such as TensorFlow and/or PyTorch is being studied. In this study, the problem is addressed by leveraging these frameworks' implemented stochastic gradient descent and backpropagation algorithms to minimise the  $\chi^2$  as the cost function. A proof-of-principle example with a generic detector setup is presented.

**Author:** Mr BRUNNER, David (Stockholm University (SE))

**Co-authors:** BRUCKMAN DE RENSTROM, Pawel (Polish Academy of Sciences (PL)); KUHL, Thorsten (Deutsches Elektronen-Synchrotron (DE))

**Presenter:** Mr BRUNNER, David (Stockholm University (SE))

**Session Classification:** Plenary