Advanced Artificial Intelligence for precision High Energy Physics

Lake Como School of Advanced Studies - July 17-28 2023

General Information

Artificial intelligence techniques are becoming increasingly important in high energy physics (HEP), with a range of applications that goes from analytic computations to modeling and optimization. Many of these applications tackle cutting-edge problems in machine learning (ML), and in fact address issues, such as the need to accurate uncertainty estimations, that are often disregarded in the most common ML applications. The goal of this school is to provide hands-on training on cutting edge machine learning methods in HEP by combining extensive advanced courses taught with extended tutorial sessions. The tutorials will exploit as a playing ground the NNPDF open-source code, which, originally aimed at the determination of parton distribution, makes use of a variety of current ML, statistical and analysis tools and techniques of wide applicability.

For information on registration, accommodation and the detailed program see https://indico.cern.ch/event/1248002/

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Organizing Committee

- **Richard D. Ball** (Edinburgh University)
- **Stefano Carrazza** (Milan University)
- **Luigi Del Debbio** (Edinburgh University)
- **Stefano Forte** (Milan University)
- **José Ignacio Latorre** (Quantum Research Centre, Abu Dhabi, and Center for Quantum Technologies Singapore)
- **Emanuele Nocera** (Turin University)
- **Juan Rojo** (Free University Amsterdam and NIKHEF)
- **Maria Ubiali** (Cambridge University)

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Lecturers and Topics – Tutors

- **Tilman Plehn** (Heidelberg University): Machine learning techniques
- **Jennifer Smillie** (Edinburgh University): Quantum Chromodynamics
- **Artur Garcia** (Barcelona Supercomputing Center): Quantum Machine Learning
- **Maurizio Pierini** (CERN): Bayesian methods and data analysis

Tutors

- **Andrea Barontini** (Milan University)
- **Alessandro Candido** (Istituto Nazionale di Fisica Nucleare)
- **Juan Cruz Martinez** (CERN)
- **Tommaso Giani** (NIKHEF and VU Amsterdam)
- **Felix Hekhorn** (Milan University)
- **Zahari Kassabov** (Cambridge University)
- **Niccolò Laurenti** (Milan University)
- **Giacomo Magni** (NIKHEF and VU Amsterdam)
- **Andrea Pasquale** (Milan University)
- **Tanjona Rabemananjara** (NIKHEF and VU Amsterdam)
- **Christopher Schwan** (Würzburg University)
- **Tanishq Sharma** (Turin University)
- **Roy Stegeman** (Edinburgh University)
- **Matteo Robbiati** (Milan University and CERN)