Machine Learning for High Energy Physics, on and off the Lattice

September 27 - October 1, 2021

Abstract | Main Topics

Machine learning (ML) has been recently used as a very effective tool for the study and prediction of data in various fields of physics, from statistical physics to theoretical high energy physics. The aim of this workshop is to bring together active researchers on ML and Physics to interact and initiate a collaborative effort to investigate timely problems on Lattices and Theoretical High Energy Physics. Hence we invite scientists with research areas covering a broad spectrum to present their work. Some of the topics which will be highlighted are supervised and unsupervised identification of phase transitions on lattice models, applications of generative algorithms in the production of lattice configurations, applications of machine learning estimators in observables in Lattice QCD and the connection of ML with Renormalization Group as well as the gauge/gravity correspondence.

Machine Learning and Renormalization Group -- Investigation of Phase Transitions using machine learning techniques Machine Learning in Gauge/Gravity Correspondence -- Application of generative algorithms on Lattices Machine learning estimators in observables in Lattice QCD

Keynote speakers

Barak **Bringoltz** (Nova Measuring instruments), Juan **Carrasquilla** (Vector Institute),Marco **Cristoforetti** (FBK), William **Detmold** (Massachusetts Institute of Technology), Robert **De Mello Koch** (University of the Witwatersrand/South China Normal University), Tommaso **Dorigo** (INFN), Shotaro **Shiba Funai** (Okinawa Institute and Science and Technology), Koji **Hashimoto** (Osaka University), Yang-Hui **He** (City, University of London & Oxford University), Gurtej **Kanwar** (Massachusetts Institute of Technology), Ava **Khamseh** (The University of Edinburgh), Thomas **Luu** (Forschungszentrum Jülich/Universität Bonn), Srijit **Paul** (University of Mainz), Sam **Foreman** (Argonne National Laboratory), Boram **Yoon** (Los Alamos National Laboratory), Di **Luo** (University of Illinois at Urbana-Champaign), Sebastian Johann **Wetzel** (Perimeter Institute), Andrei **Alexandru** (George Washington University), Marina **Marinkovic** (ETH), Dimitrios **Bachtis** (Swansea University).

Organizers

Andreas **Athenodorou** (Università di Pisa & The Cyprus Institute); Kyle **Cranmer** (New York University); Dimitrios **Giataganas** (National Sun Yat-sen University) ; Biagio **Lucini** (Swansea University); Enrico **Rinaldi** (University of Michigan); Constantia **Alexandrou** (University of Cyprus & The Cyprus Institute)