

Cristiano Fanelli**Research Scientist,
Massachusetts Institute of Technology (MIT)****Tuesday, July 12th, 2022
12:00 PM – 1:00 PM****Register in advance for
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the meeting.****Host: Jin Huang, Physics**

Leveraging on intelligent workflows to assist the design of the Electron Ion Collider first detector

Abstract: The Electron-Ion Collider (EIC) is a cutting-edge accelerator facility that will study the nature of the "glue" that binds the building blocks of the visible matter in the universe. The proposed experiment will be realized at Brookhaven National Laboratory in approximately 10 years from now, with detector design and R&D currently ongoing. Notably, EIC is one of the first large-scale facilities to leverage Artificial Intelligence (AI) already starting from the design and R&D phases. Workflows based on AI have been already utilized during the detector proposal phase and contributed to steer the design of the reference detector tracking system. The work required a complex parametrization of the simulated detector system. Our approach dealt with an optimization problem in a multidimensional design space driven by multiple objectives, characterized by several mechanical constraints. The AI-assisted design is agnostic to the simulation framework and can be extended to other sub-detectors or to a system of sub-detectors to further optimize the performance of the EIC detector. In this talk I will provide a general overview of how AI can contribute to the EIC detector design. I will start from the implemented strategy and the results obtained for the tracking system [arXiv:2205.09185] and conclude with plans on how to possibly extend this work.

Biography: Cristiano Fanelli has been a Research Scientist at MIT and Adjunct Professor at U. of Regina since 2020. He earned his PhD from Sapienza U. (2015 JLab thesis prize) and he is the recipient of the JLab postdoc prize in 2018 for deep learning applied to PID for imaging Cherenkov detectors. He is the author of the first AI-based paper on detector design for the EIC dRICH and IAEA/UN invitee to report on the AI-assisted design efforts at EIC. He is also involved in developing reconstruction algorithms for streaming readout. He is currently the convener of the EICUG AI WG (AI4EIC) and of the Detector-I Computing and Software WG.