AI/ML for SoLID/JLab

- AI/ML for last beam test: PID detectors (Cherenkov, ECal) (UVa group/Zhiwen)

- AI/ML for tracking: de-noising (Gagik)

- SoLID as self-driving detector (Klaus)

- Possible AI/ML proposal for future (Gagik, also Alexandre/Zhiwen/Xiaochao)

- Genisis Mission, future opportunitie

- AI for particle physics whitepaper

Jefferson Lab AI effort

Gagik Gavalian

February 18, 2026

Abstract

The SoLID detector at Jefferson Lab is designed to operate at extremely high luminosities, producing data rates that far exceed the capabilities of traditional reconstruction algorithms. Incorporating modern AI techniques into the detector-reconstruction workflow is therefore essential for achieving

Building an AI-native Research Ecosystem for Experimental Particle Physics: A Community Vision

February 12, 2026 - Version 0.81 (draft)

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In response to several suggestions from the NP community, we have added the additional paragraph below in the Nuclear Science Drivers section. I hope this looks good to you!

cheers,
Peter

In the years preceding the start of the EIC physics program, the 2023 LRP emphasizes the completion of the RHIC mission and its transition into the EIC, while noting that the LHC heavy-ion program will provide the world-leading facility for hot-QCD studies in that pre-EIC era. At the LHC, the ALICE experiment is dedicated to studying the quark-gluon plasma with properties of the early universe, at temperatures of trillions of degrees and with near symmetry between matter and antimatter. A deep AI integration in the next-generation ALICE 3 detector, designed to replace ALICE and operate in 2035

and beyond, would be transformational in achieving and extending the experiment´s physics output. Similarly, medium-energy efforts at Jefferson Lab-including the Measurement of a Lepton-Lepton Electroweak Reaction (MOLLER)~\cite{moller-jlab} and the Solenoidal Large Intensity Device (SoLID)~\cite{solid-jlab} experiments within the ongoing CEBAF 12 GeV program-will benefit from further integration of emerging AI technology across
detector design, real-time operation, reconstruction, and uncertainty-aware analysis. Looking ahead, the LRP also highlights a staged CEBAF evolution that begins with high-duty-cycle polarized positron capabilities at 12 GeV and could
progress to a $\sim$22 GeV electron program while maintaining world-leading luminosity; fully exploiting these opportunities will rely on AI-enabled tooling spanning all four Grand Challenges.

New Member for SoLID Collaboration, Next Meeting

- One nomination for new member:

Lorenzo Rossi, University of Milan and INFN Section of Milan, Italy

Nominated by Vlad Khachatryan:
"Lorenzo is a theorist who has made a great contribution to our 'SIDIS unpolarized cross section' run-group proposal and to the corresponding paper" which was submitted for publication and on arXiv.

Unanimously approved by the SoLID Executive committee.

- Next collaboration meeting:
  Dates: in about 6 months?
  Place: user institution?   Jointly with a workshop?