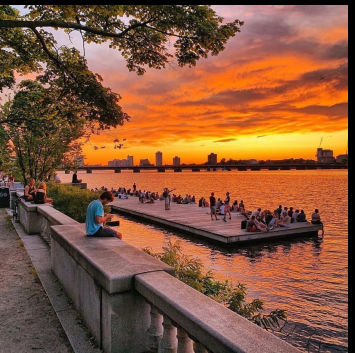
4th AI4EIC Workshop
Hosted by MIT/IAIFI

C. Fanelli, T. Horn on behalf of AI4EIC

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
WILLIAM BARTON ROGERS FOUNDER

AI4EIC



MIT

Thanks to Organizing Committees (AI4EIC-2025)

Local Organizing Committee (MIT):

- Ethan Cline
- Gian Michele Innocenti
- Marisa LaFleur
- Mike Williams
- Noah Wuerfel
- Or Hen
- Phiala Shanahan
- Thomas Bradford

MIT
NSF AI Institute for Artificial Intelligence and Fundamental Interactions (IAIFI)

Special thanks to Marisa!!
Local point of contact: mlafleur@mit.edu

Thanks to Organizing Committees (AI4EIC-2025)

Scientific Organizing Committee:

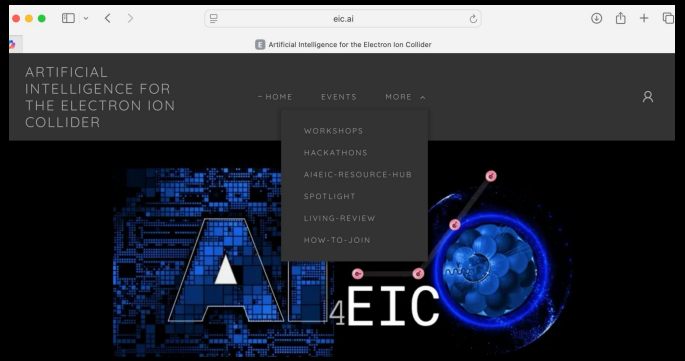
- Abhay Deshpande, BNL/SBU
- Ben Nachman, Stanford
- Cris Fanelli, W&M
- David Lawrence, JLAB
- Malachi Schram, JLAB
- Marco Battaglieri, INFN
- Mike Williams, MIT
- Or Hen, MIT
- Phiala Shanahan, MIT
- Tanja Horn, CUA
- Torre Wenaus, BNL

AI4EIC Contact: ai4eic@gmail.com
support@eic.ai

Email support@eic.ai to subscribe to mailing list
Check-out ai4eic Slack channel on eic.ai

Resources

- AI4EIC-2025 Workshop Indico
  - http://indico.bnl.gov/event/AI4EIC2025
- AI4EIC Website
  - https://eic.ai



- We are aiming to share recordings of as many of the talks as possible. Please use this link or this QR code to fill out the consent form: http://bit.ly/4hz6u5w

Format: 2 sessions/day for 3 Days (Oct 27-29)

Day 1

AI/ML for Accelerators

- Brahim Mustapha (Argonne National Lab)
- Kevin Brown (Brookhaven National Lab)

Calibration, Monitoring, and Experimental Control in Streaming Environments

- Torri Jeske (Jefferson Lab)
- Yeonju Go (Brookhaven National Lab)

Day 2

AI/ML for ePIC and Beyond

- Anselm Vossen (Duke University)
- Rachel Montogomery (U. of Glasgow)
- Wenliang (Bill) Li (Mississippi State University)

AI/ML for Data Analysis and Theory

- Brandon Kriesten (Argonne National Laboratory)
- Simonetta Liuti (University of Virginia)

Day 3

Trends in Data Science

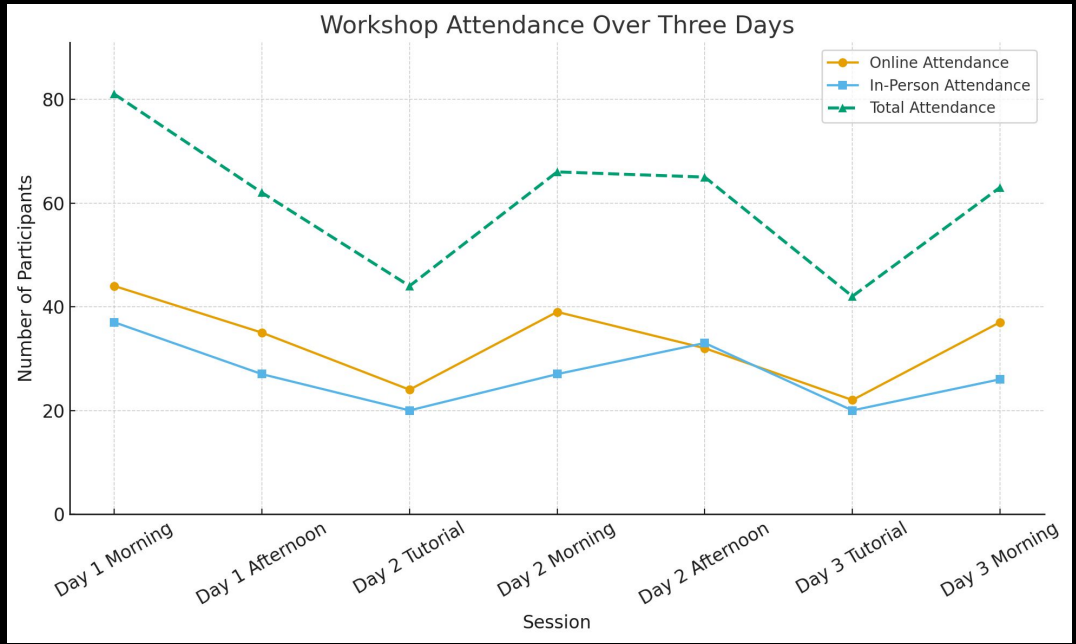
- Philip Harris (Massachusetts Institute of Technology)
- Yaohang Li (Old Dominion University)

AI/ML in Production, Distributed ML

- Kishan Rajput (Jefferson Lab)
- Ray Ren (Brookhaven National Lab)

Contributions

- 58 contributions + 2 tutorials, great talks! Thanks a lot to all the speakers!
- 160 registered participants. Average total attendance of 60+, with 30+ in person in the first 2 days



Contributions

- 58 contributions + 2 tutorials, great talks! Thanks a lot to all the speakers!
- 160 registered participants. Average attendance of 30+, with 30+ in person in the first 2 days and in the morning session
- Thanks also to the local and scientific advisory committee to make this workshop possible.
- Thanks to the Conveners for their great work in organizing the sessions and managing to handle unexpected changes in the program. Many talks presented novel methodologies and were extremely engaging.
- Reminder to the Convener: please complete your summary notes in the Live Notes Document

Some Key-Points

- AI opportunities at the new EIC: from accelerator applications to emerging capabilities enabled by large language models.
- Open data and benchmarks: a shared need for accessible datasets and standardized evaluation frameworks.
- Uncertainty Quantification in AI/ML: a recurring theme across multiple sessions emphasizing its central role.
- Vibrant research ecosystem at the nexus between AI and EIC: DOE and NSF support a wide range of projects presented at AI4EIC involving universities, national labs, and industry.
- Broad technical landscape: AI serves as the common foundation connecting diverse research areas. Cross-community synergies: strong potential for collaboration with HEP, data science, and related fields.

DE-FOA-0002875 (deadline: Jan 11, 2023; award ceiling $2M/year)
Artificial Intelligence and Machine Learning For Autonomous Optimization and Control of Accelerators and Detectors

NP held a one-day roundtable on "Machine Learning and Artificial Intelligence for NP Accelerator Facilities" on January 30, 2020, with focus on discussing opportunities in AI/ML for improving efficiencies of accelerator operations of NP facilities. Additional information on the workshop and copies of presentations can be found at: https://science.osti.gov/np/Research/ai. An NP community workshop at TJNAF in March of 2020 considered priority research opportunities in AI/ML. Also, an NP community computational science workshop in September 2022 was held to identify future directions in computational nuclear physics by a combination of high-performance computing combined with AI/ML and experimental data. And in October of 2022, an AI for EIC workshop was held to address how AI might contribute to advance research, design and operation of the future EIC. More information on these workshops and meetings can be found in the Reference section below.

DE-FOA-0003845 (deadline: Jan 14, 2025; lab award ceiling $3.5M/year)
Artificial Intelligence and Machine Learning Applied to Nuclear Science and Technology

2022 identified future directions in computational nuclear physics by a combination of high-performance computing combined with AI/ML and experimental data. And in October 2022 and October 2023, AI for EIC workshops were held to address how AI might contribute to advance research, design and operation of the future EIC. More information on these workshops and meetings can be found in the Reference section below.

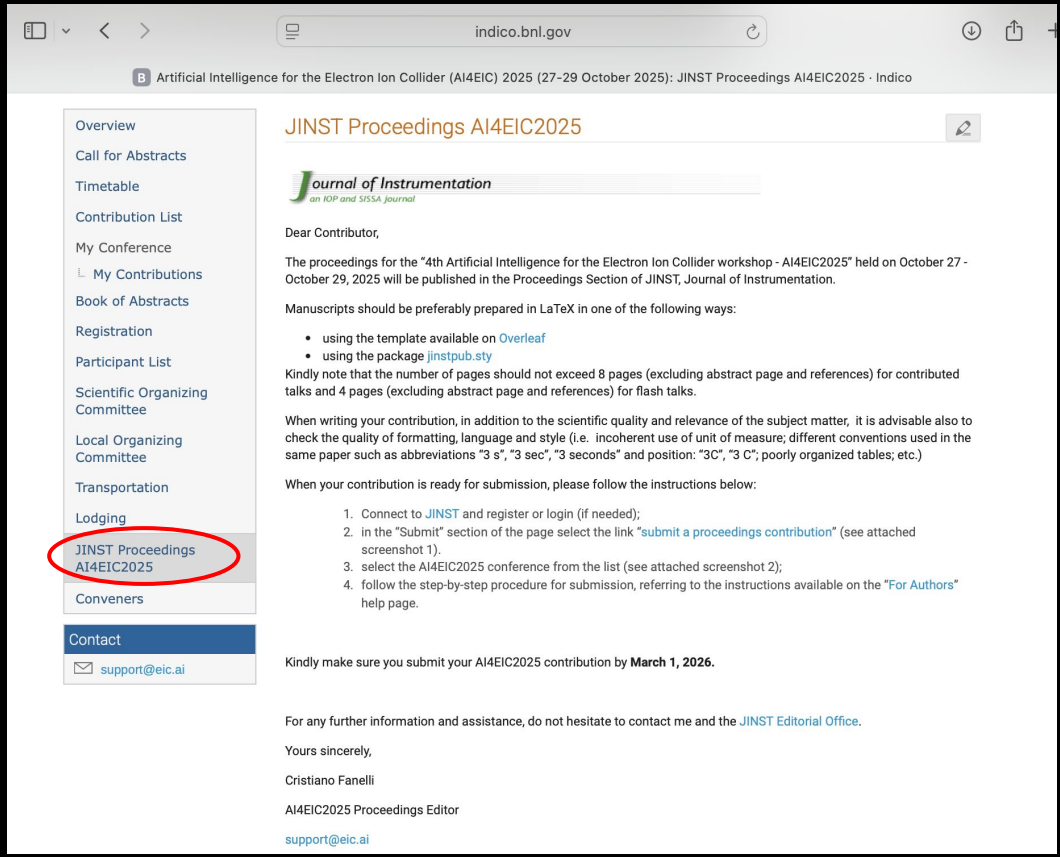
Proceedings

http://indico.bnl.gov/event/AI4EIC2025

All contributions can result in a proceeding on JINST.

Note that the number of pages should not exceed 8 pages (excluding abstract page and references) for contributed talks and 4 pages (excluding abstract page and references) for flash talks.

More information will be sent to the speakers in the next few days



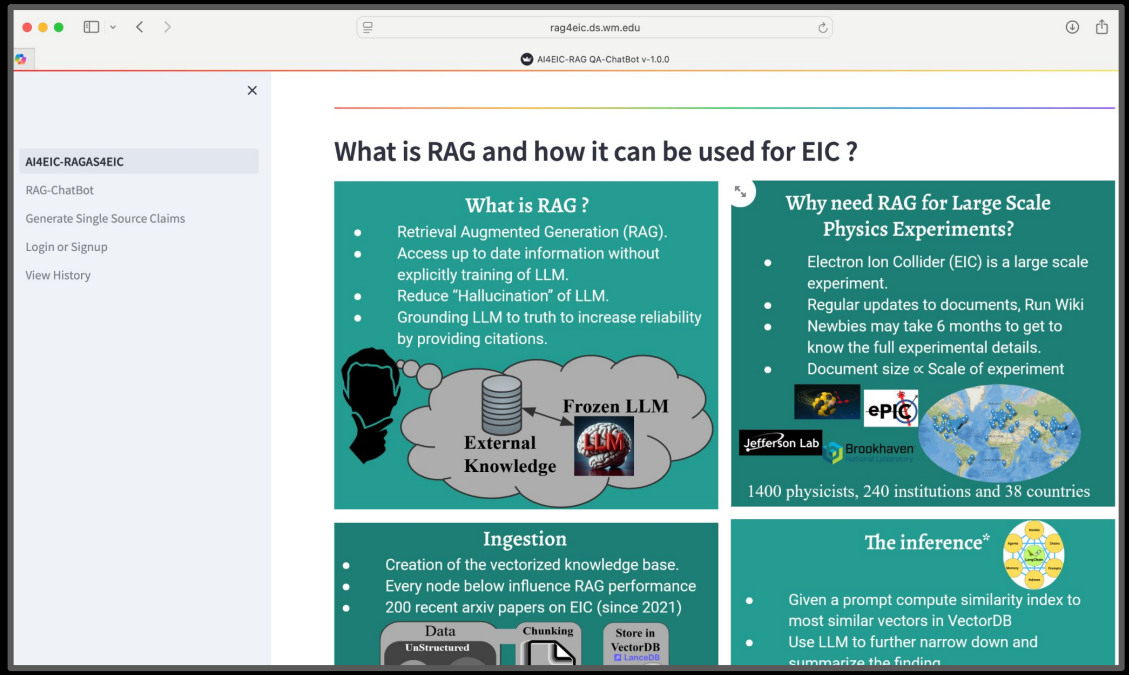
Activities @ AI4EIC

Checkout RAG4EIC project
https://rag4eic.ds.wm.edu/

Contact support@eic.ai if you want to contribute

See also tutorials given during AI4EIC-2025 by Karthik Suresh

https://rag4eic.ds.wm.edu/

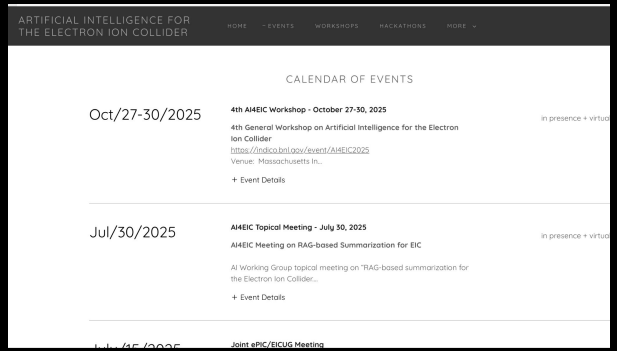


Other Events @ AI4EIC

- Contact support@eic.ai to subscribe to the AI4EIC mailing list
  - AI4EIC organizes workshops, tutorial, topical meetings, hackathons, etc.
  - Additionally, we are currently supporting the activities of two sub-working groups: ‘AI for agents at EIC’ and ‘AI/ML for accelerators’
  - We are looking to form new sub-working groups - please reach out for ideas, initiatives

https://eic.ai/events

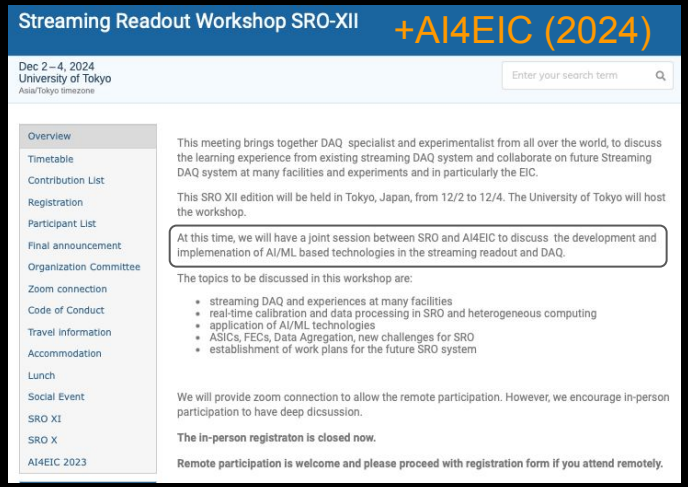
https://eic.ai/ai4eic-resource-hub



AI4EIC Workshops

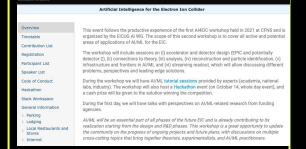
https://eic.ai/workshops

- 5 workshops organized or co-organized by the AI4EIC WG. In the last 12 months we contributed to organize the joint session with the Streaming Readout at the Streaming Readout Workshop SRO-XII held in Tokyo Dec 2024, and we are currently organizing the 4th AI4EIC workshop that will be held at MIT supported by the Institute for Artificial Intelligence and Fundamental Interactions (IAIFI)



40 contributions overall, with 1:4 on AI/ML in SRO.

Past Editions



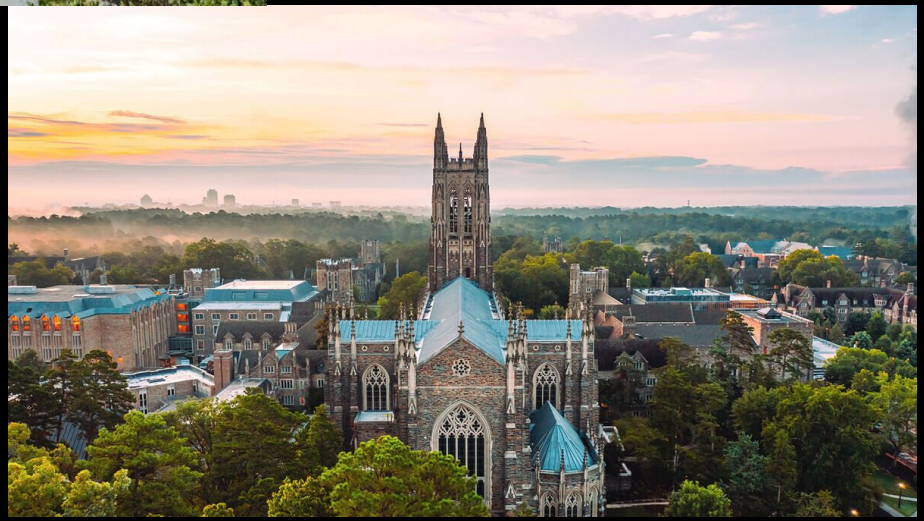
All contributions to AI4EIC-2025 can be published as proceedings on JINST

Looking Ahead

- Announcement: AI4EIC-2026 workshop will take place at Duke University!

Duke
UNIVERSITY

Durham, North Carolina, US



Looking Ahead

- There is still interest in organizing the next AI4EIC events in Europe.
- Reach out if your institution is interested to host in the following years.
- EIC's unique position: likely the only new collider in the U.S. for decades, making it a focal point for innovation.
- Progress since the last workshop: many of the ideas discussed have evolved into DOE-funded projects on AI/ML for the EIC and nuclear physics at large.
- Current stage: we are now reviewing ongoing efforts, identifying shared challenges, complementarities, and opportunities for synergy across projects.
- AI4EIC remains the key forum to connect these initiatives and strengthen collaboration across the community.

See You at AI4EIC-2026!

https://eic.ai

support@eic.ai

- To subscribe to mailing list
- For reaching out to regarding AI4EIC events