

# Project eAST and SWG Priorities in 2021

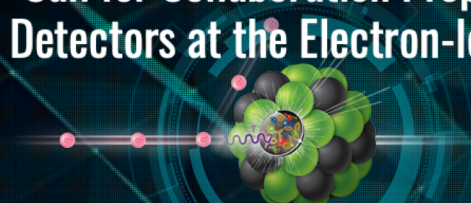
## Call for Expressions of Interest for Potential Cooperation on the EIC Experimental Program



Brookhaven National Laboratory (BNL), in association with Thomas Jefferson National Accelerator Facility (TJNAF), calls for an Expression of Interest (EOI) for potential cooperation on the experimental equipment as required for a successful science program at the Electron-Ion Collider (EIC). This call emphasizes all detector components to facilitate the full EIC science program including those integrated in the interaction regions.

**Realize Software Eoi**

## Call for Collaboration Proposals for Detectors at the Electron-Ion Collider



Brookhaven National Laboratory (BNL) and the Thomas Jefferson National Accelerator Facility (JLab) are pleased to announce the Call for Collaboration Proposals for Detectors to be located at the Electron-Ion Collider (EIC). The EIC will have the capacity to host two interaction regions, each with a corresponding detector. It is expected that each of these two detectors would be represented by a Collaboration.

**Support of Collaboration Proposals**

**Andrea Bressan (Trieste), Markus Diefenthaler (JLab), Torre Wenaus (BNL)**

# Project eAST as a common projects

<https://eic.github.io/activities/eoi.html>

## Expression of Interest (EOI) for Software

Please indicate the name of the contact person for this submission:

Conveners of the Software Working Group:

- A. Bressan, M. Diefenthaler, and T. Wenaus
- [eicug-software-conveners@eicug.org](mailto:eicug-software-conveners@eicug.org)

Please indicate all institutions collectively involved in this submission of interest:

ANL	Argonne National Laboratory	<b>29 institutions</b>
BNL	Brookhaven National Laboratory	
CEA/Irfu	IRFU at CEA /Saclay institute	
EIC-India	Akal University, Central University of Karnataka, DAV College Chandigarh, Goa University, Indian Institute of Technology Bombay, Indian Institute of Technology Delhi, Indian Institute of Technology Indore, Indian Institute of Technology Patna, Indian Institute of Technology Madras, Malaviya National Institute of Technology Jaipur, Panjab University, Ramkrishna Mission Residential College Kolkata	
IMP-CAS	Institute of Modern Physics - Chinese Academy of Sciences	
INFN	Istituto Nazionale di Fisica Nucleare	
JLab	Thomas Jefferson National Accelerator Facility	
LANL	Los Alamos National Laboratory	
LBNL and UC Berkeley	Lawrence Berkeley National Laboratory and University of California, Berkeley	
NCBJ	National Centre for Nuclear Research	
OhioU	Ohio University	
ORNL	Oak Ridge National Laboratory	
SBU	Stony Brook University	
SLAC	SLAC National Accelerator Laboratory	
SU	Shandong University	

<https://indico.bnl.gov/event/8552/contributions/43221/>

- **Software Tools for Simulations and Reconstruction**
  - Monte Carlo Event Generators
  - **Detector Simulations** Project eAST
  - Reconstruction
  - **Validation** detector simulations, test-beam data
- Middleware and Preservation
  - Workflows
  - Data and Analysis Preservation
- Interaction with the Software Tools
  - Explore User-Centered Design
  - Discoverable Software
  - Data Model
- **Future Technologies**
  - Artificial Intelligence
  - Heterogeneous computing
  - New languages and tools
  - Collaborative software

# Project eAST in a nutshell

## Detector Simulation

- **comprehensive, centrally maintained application**
- **based on Geant4 for fast and full simulations**
- **with library of potential detector options**

## Requirements

- ability to **reuse existing simulation work**
- ease of **switching detector options**
- ease of switching between **detailed and coarse** detector descriptions
- ease of **leveraging new and rapidly evolving** technologies,
  - e.g., AI/ML
  - computing hardware, e.g., heterogeneous architectures

## Project Leader

- Makoto Asai (SLAC), Geant4 project leader and deep technical expert for >20yrs.



# Project eAST: Unify the Simulation Effort with the Community

The SWG is launching **eAST**, a **common effort on next-generation simulations**:

- building on the work done in the existing simulations,
- a requirement for the common toolkit is that it integrates existing detector simulations in a modular way.
  - **Community Scenario** Members of ATHENA and ECCE involved. *Possible* migration to common tool after the current phase, in 2022.



eA Simulation Toolkit  
for all stages of the EIC

## Meetings on Project eAST with wider EIC community

- including many representatives from ATHENA, CORE, ECCE

**03/25** Discussion of proposal and possible work plan

**03/31** Discussion for anyone who could not attend on 03/25

### Material

- [Introduction to Project eAST](#)
- [Writeup on Project eAST](#), including community feedback

**05/05** Update