

# Expression of Interest for Software

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## Expression of Interest (EOI) for Software

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

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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/>

## Common Projects

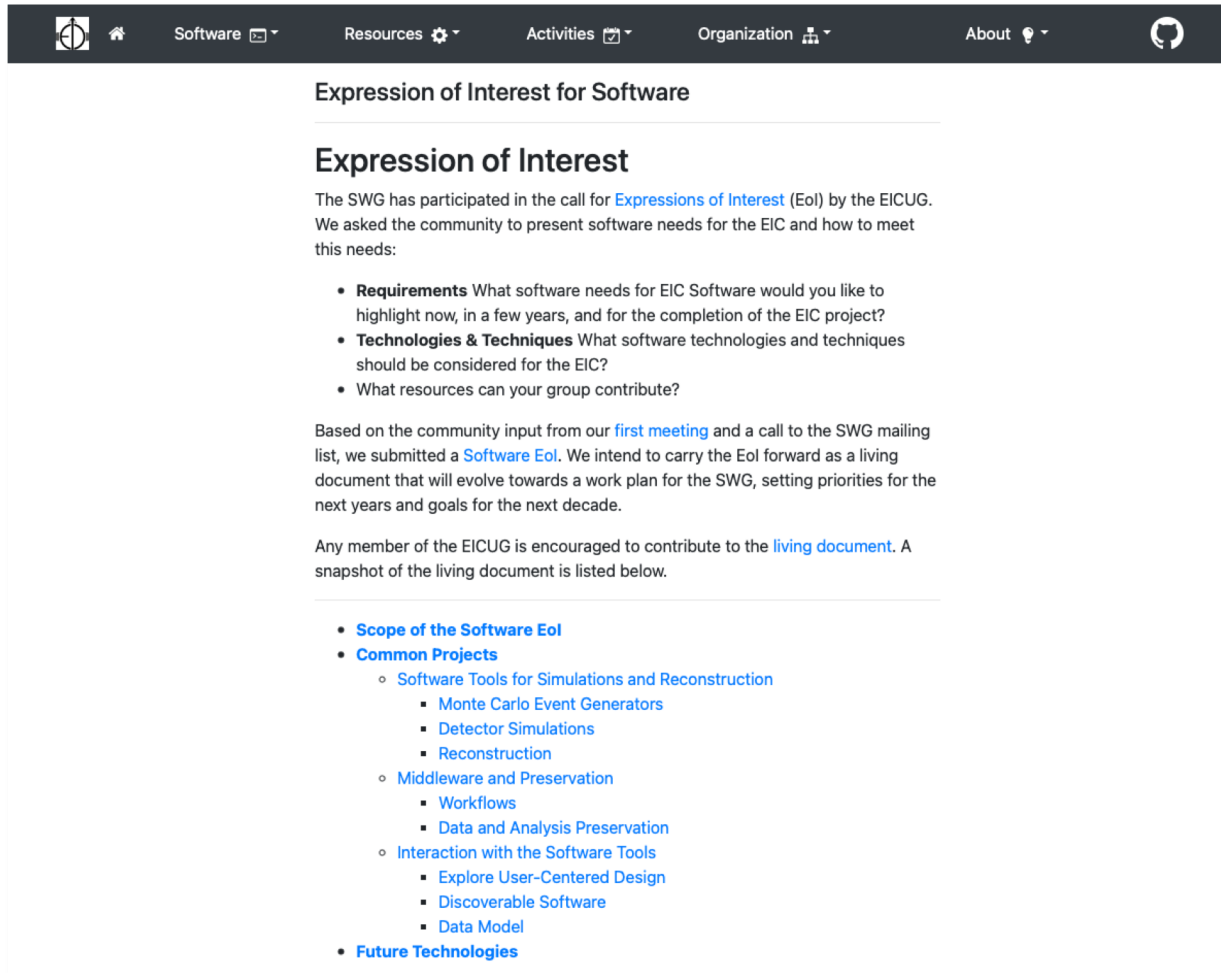
- **Software Tools for Simulations and Reconstruction**
  - Monte Carlo Event Generators
  - Detector Simulations
  - Reconstruction
- **Middleware and Preservation**
  - Workflows
  - Data and Analysis Preservation
- **Interaction with the Software Tools**
  - Explore User-Centered Design
  - Discoverable Software
  - Data Model

## Future Technologies

- Artificial Intelligence
- Heterogeneous computing
- New languages and tools
- Collaborative software

# Evolving the Eol towards a Work Plan for the SWG

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



The screenshot shows the top navigation bar with links for Software, Resources, Activities, Organization, and About. The main content area is titled "Expression of Interest for Software" and contains the following text and lists:

## Expression of Interest

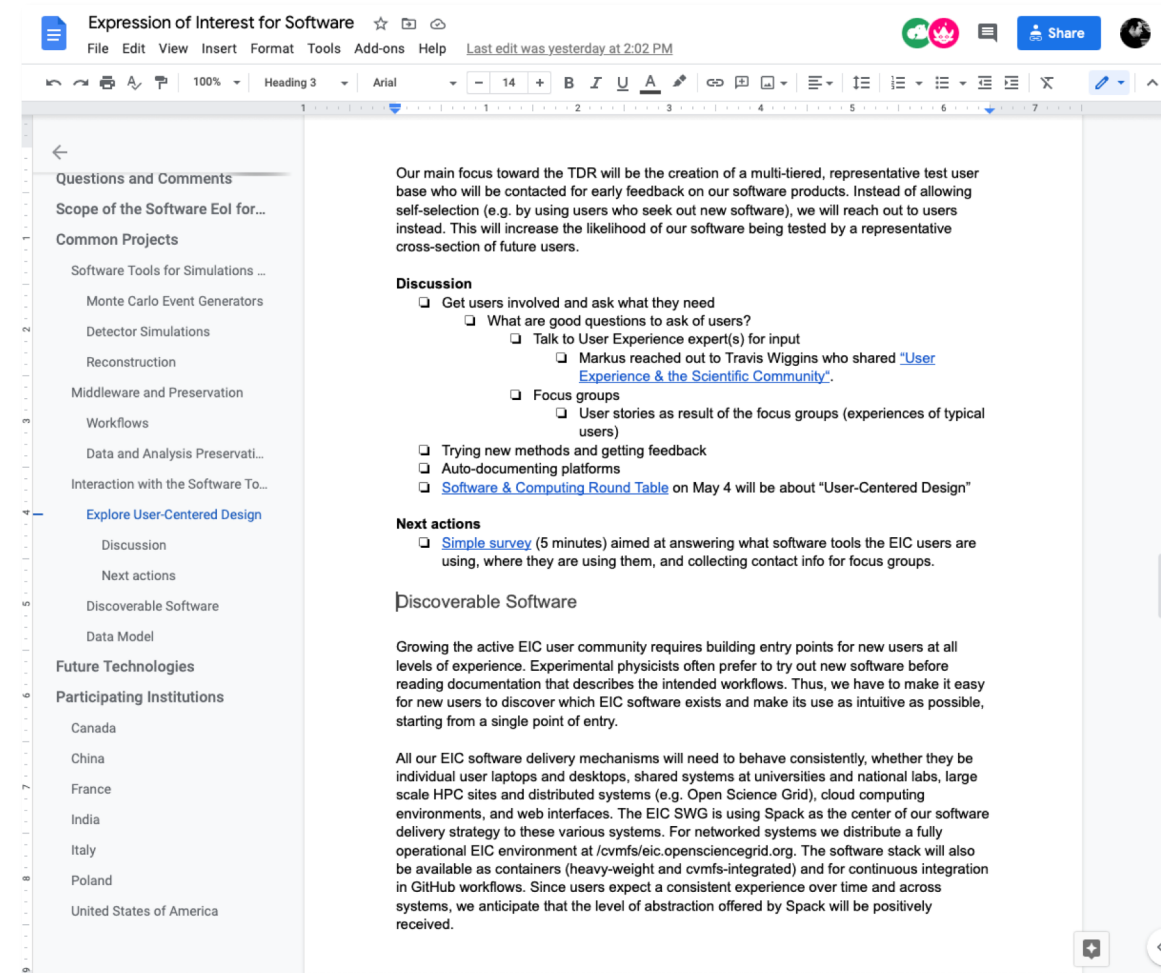
The SWG has participated in the call for [Expressions of Interest](#) (Eoi) by the EICUG. We asked the community to present software needs for the EIC and how to meet this needs:

- **Requirements** What software needs for EIC Software would you like to highlight now, in a few years, and for the completion of the EIC project?
- **Technologies & Techniques** What software technologies and techniques should be considered for the EIC?
- What resources can your group contribute?

Based on the community input from our [first meeting](#) and a call to the SWG mailing list, we submitted a [Software Eoi](#). We intend to carry the Eoi forward as a living document that will evolve towards a work plan for the SWG, setting priorities for the next years and goals for the next decade.

Any member of the EICUG is encouraged to contribute to the [living document](#). A snapshot of the living document is listed below.

- **Scope of the Software Eoi**
- **Common Projects**
  - [Software Tools for Simulations and Reconstruction](#)
    - [Monte Carlo Event Generators](#)
    - [Detector Simulations](#)
    - [Reconstruction](#)
  - [Middleware and Preservation](#)
    - [Workflows](#)
    - [Data and Analysis Preservation](#)
  - [Interaction with the Software Tools](#)
    - [Explore User-Centered Design](#)
    - [Discoverable Software](#)
    - [Data Model](#)
- **Future Technologies**



The screenshot shows the same content as the previous image but in a rich text editor interface. The editor title is "Expression of Interest for Software" and it includes a menu bar with options like File, Edit, View, Insert, Format, Tools, Add-ons, and Help. The content is formatted with bold text for section headers and lists, and includes a table of contents on the left side of the editor window.

## Expression of Interest for Software

Our main focus toward the TDR will be the creation of a multi-tiered, representative test user base who will be contacted for early feedback on our software products. Instead of allowing self-selection (e.g. by using users who seek out new software), we will reach out to users instead. This will increase the likelihood of our software being tested by a representative cross-section of future users.

### Discussion

- Get users involved and ask what they need
  - What are good questions to ask of users?
    - Talk to User Experience expert(s) for input
      - Markus reached out to Travis Wiggins who shared "[User Experience & the Scientific Community](#)".
    - Focus groups
      - User stories as result of the focus groups (experiences of typical users)
  - Trying new methods and getting feedback
  - Auto-documenting platforms
  - [Software & Computing Round Table](#) on May 4 will be about "User-Centered Design"

### Next actions

- [Simple survey](#) (5 minutes) aimed at answering what software tools the EIC users are using, where they are using them, and collecting contact info for focus groups.

### Discoverable Software

Growing the active EIC user community requires building entry points for new users at all levels of experience. Experimental physicists often prefer to try out new software before reading documentation that describes the intended workflows. Thus, we have to make it easy for new users to discover which EIC software exists and make its use as intuitive as possible, starting from a single point of entry.

All our EIC software delivery mechanisms will need to behave consistently, whether they be individual user laptops and desktops, shared systems at universities and national labs, large scale HPC sites and distributed systems (e.g. Open Science Grid), cloud computing environments, and web interfaces. The EIC SWG is using Spack as the center of our software delivery strategy to these various systems. For networked systems we distribute a fully operational EIC environment at [/cmfms/eic.opensciencegrid.org](#). The software stack will also be available as containers (heavy-weight and cvmfs-integrated) and for continuous integration in GitHub workflows. Since users expect a consistent experience over time and across systems, we anticipate that the level of abstraction offered by Spack will be positively received.

# Update on Common Projects

- **Software Tools for Simulations and Reconstruction**
  - Monte Carlo Event Generators
    - **02/24** Kolja reported on [maintaining Pythia6 for the EIC](#).
    - **03/10** Prabi reported on [MC-data comparisons](#) for the EIC and Barak discussed [random number seeding](#)
  - Detector Simulations
  - Reconstruction
    - **02/24** Joe Osborn updated us on [ACTS for the EIC](#).
- **Middleware and Preservation**
  - Workflows
  - Data and Analysis Preservation
  - **02/24, later** Kolja, Markus, Maxim, Sylvester, and Wouter will give update on [prototype](#).
- **Interaction with the Software Tools**
  - Explore User-Centered Design
    - **03/03** Kolja, Markus, Rebecca, Sylvester, Wouter presented [report on “Status of Software Survey.”](#)
  - Discoverable Software
    - Spack (Wouter)
  - Data Model
    - Common output format (Dmitry), data model for streaming readout (Jan)
- **Validation**
  - [MCEGs](#)
  - **Fast simulations** [eic-smear](#)
  - **Full simulations** ESCalate, [Fun4All](#)