Editor's corner:

- The points below are unordered and not presented in a crisp manner.
- We welcome good ideas for the structure and a theme for how to present each principle.
- The final list should fit on one page and be comprehensive for experts and non-experts.

Version 1

EIC Software: Statement of Principles

We aim to develop a diverse workforce, while also cultivating an environment of inclusivity and a culture of belonging.

We will have an unprecedented compute-detector integration:

- We will have a common software stack for online and offline software.
- We aim for autonomous alignment and calibration.
- We aim for a rapid turnaround of the raw data to online and offline physics analyses and do this in near real time.

We will aim for user-centered design:

- Scientists of all levels worldwide and with various software training backgrounds will be able to actively participate in EIC analysis.
- We will consider the experiences with which typical EIC users enter their research projects and typical career paths that EIC users take after their research projects to streamline their experiences to our benefit in productivity, recruitment, and retention.

We will have reproducible software and re-usable, and re-interpretable analyses:

- Data and analysis preservation will be an integral part of the workflow tools.
- We will document our software and workflows to enable future users and developers to quickly contribute and to preserve the reproducibility of the software.

Our data formats are open, simple and self-descriptive:

- **Needs work on wording [Sylvester]**: We will facilitate collaboration with domain experts, in particular data scientists, so that our data can be interpreted by non EIC-scientists, using common software tools.

Future compatibility of hardware and software:

- EIC software will need to make efficient use of computing resources provided. Similar to commercial and scientific computing, this will include heterogeneous computing resources.
- EIC Software – where appropriate – will have the capability to run on heterogeneous computing architectures.
- **[Shorten Joe]** We will have a modular software design with structures robust against changes in the computing environment so that changes in underlying code can be handled without an entire overhaul of the structure.
- **[Shorten Joe]** The modular approach places emphasis on communication between components (data model), providing flexible entry points for algorithms at all levels of the

software. This maximizes the possibility for collaborators to creatively develop new tools without having to interface with a complex software environment.
- **[Shorten Joe]** We will design the software in a forward-looking way from the start and we understand that retrofitting features does neither lead to performant software nor to efficient development.

Our software will run everywhere, easily
- **Needs re-write [Sylvester]:** We will enable distributed workflows to leverage HTC and HPC capabilities worldwide. Our software should be able to run on as many systems as possible, while supporting specific system characteristics (eg., accelerators) where needed.
- We will use effective data orchestration to minimize the amount of bookkeeping to be done by the users.

We will not reinvent the wheel:
- We understand that EIC simulation, reconstruction, and analysis software needs are for the majority not unique to EIC, and to large extents already in production or under advanced development at other large projects. We will build on these efforts and extend them with missing functionality.

We will embrace our community:
- Our software is publicly available for anyone to contribute to (e.g., version control) and so are our productivity tools (CI, issue tracker, etc.).
- We will ensure that mission critical software components are not dependent on the expertise of a single developer, but managed and maintained by a core group.
- We will support the community with active training and support sessions where experienced software developers and users interact with new users.
- We will support the career of software developers.

We will provide a production-ready software stack throughout the development:
- We are committed to providing a software stack that continuously evolves and can be used for any stage of the EIC and that is validated.
- We plan to continuously evaluate, adapt/develop, validate and integrate new software, workflow, and computing practices.

Version 2

EIC Software: Statement of Principles

Endorsers: W. Deconinck (University of Manitoba), M. Diefenthaler (Jefferson Lab), C. Fanelli (Massachusetts Institute of Technology), T. Horn (Catholic University of America), S. Joosten (Argonne National Laboratory), D. Lawrence (Jefferson Lab), J. Osborn (Oak Ridge National Laboratory), D. Romanov (Jefferson Lab), T. Wenaus (BNL).

Diversity, Equity, & Inclusion

We aim to develop a diverse workforce, while also cultivating an environment of inclusivity and a culture of belonging.

Computing

We will have an unprecedented compute-detector integration:

- We will have a common software stack for online and offline software.
- We aim for autonomous alignment and calibration.
- We aim for a rapid turnaround of the raw data to online and offline physics analyses and do this in near real time.

We will leverage heterogeneous computing:

- We will enable distributed workflows to leverage HTC and HPC capabilities worldwide.
- Our software should be able to run on as many systems as possible, while supporting specific system characteristics, e.g., accelerators, where needed.
- We will have a modular design to enable collaborative and efficient development that is robust against changes in computing environments.

Analysis

We will aim for user-centered design:

- Scientists of all levels worldwide will be able to actively participate in EIC analysis. Our software will run on the systems used by the community, easily, and access to the EIC data will be simple and straightforward.
- We will consider the experiences with which typical EIC users enter their research projects and typical career paths that EIC users take after their research projects to streamline their experiences to our benefit in productivity, recruitment, and retention.

Our data formats are open, simple and self-descriptive:

- We will favor simple flat data structures and formats to encourage collaboration with computer, data and other non-NP scientists. This will also lower the learning curve for new students, and facilitate long-term data preservation.

We will have reproducible software and re-usable, and re-interpretable analyses:

- Data and analysis preservation will be an integral part of our software and workflows.

Software Development

We will embrace our community:

- Our software is publicly available for anyone to contribute to and so are our productivity tools.
- We will ensure that mission critical software components are not dependent on the expertise of a single developer, but managed and maintained by a core group.
- We will support the community with active training and support sessions where experienced software developers and users interact with new users.
- We will support the careers of software developers.

We will not reinvent the wheel:

- We understand that EIC simulation, reconstruction, and analysis software needs are for the majority not unique to EIC, and to large extents already in production or under advanced development at other large projects. We will build on these efforts and extend them with missing functionality.

We will provide a production-ready software stack throughout the development:

- We will not separate the development of software and its use and support.
- We are committed to providing a software stack that continuously evolves and can be used for any stage of the EIC and that is validated.
- We plan to continuously evaluate, adapt/develop, validate and integrate new software, workflow, and computing practices.