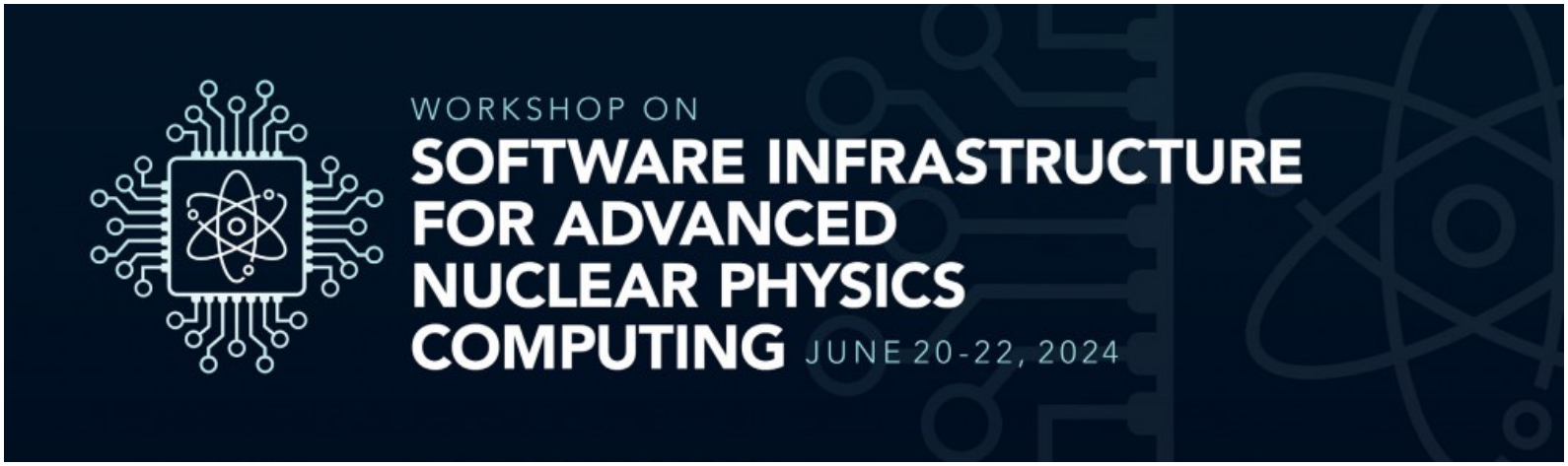

Workshop introduction

Amber Boehnlein and Peter Jacobs

For the Organizing Committee:

Amber Boehnlein (JLab), co-chair
Peter Jacobs (LBNL), co-chair
Joe Carlson (LANL)
Ian Cloet (ANL)
Markus Diefenthaler (JLab)
Robert Edwards (JLab)
Raphael Hix (ORNL)
Thomas Papenbrock (UTK)
Brad Sawatzky (JLab)
Torre Wenaus (BNL)

Software and computing have become drivers in Nuclear Physics (NP) due to the explosive growth of scientific data and exascale facilities. Exploitation of these opportunities requires new hardware architectures and new algorithmic approaches at exascale, including those based on Artificial Intelligence and Machine Learning.

New collaborative efforts have emerged to capitalize on such opportunities, bringing NP theorists and experimentalists together with data and computer scientists. A common focus of these collaborative efforts is the development of robust, large-scale Software Infrastructure frameworks to carry out their complex scientific programs. **Such frameworks require long-term support**; however, establishment of suitable support mechanisms is challenging. The curation and long-term preservation of data is an important related issue.

The 2023 NSAC Long Range Plan incorporates a vision for the future of advanced computing for NP research. This workshop will bring together NP computing practitioners to discuss the implementation of this vision, with a focus on identifying mechanisms to achieve long-term, sustainable Software Infrastructure. A key output of the workshop will be a **White Paper documenting community consensus on critical research directions, concerns, and opportunities in this area**.

The workshop program will cover a broad range of current software and computing projects in the Nuclear Physics domain. Discussions will include general issues such as the role of research vs. infrastructure software, development of common software ecosystems, software sustainability best practices, and workforce development. Consideration of new opportunities will be carried out in the context of existing and currently planned DOE and NSF programs that support advanced NP computing and cyber-infrastructure.

Workshop is in response to a request from the Agencies for guidance

- opportunity to help shape the future NP program in Advanced Computing

Product of the Workshop: White Paper

Workshop structure:

1. Survey of the field: funded collaborations, open mic, discussion with agencies
2. Parallel sessions: unstructured discussion to develop White Paper bullets and supporting text in main sub-areas
3. Plenary: White Paper draft of bullets and supporting text

Agenda Thursday 6/20

Timetable

Thu 20/06 | Fri 21/06 | Sat 22/06 | All days

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Session legend

Main Session | Open Mic Plenary

09:00
- Welcome; Safety; Conference Logistics — Auditorium, Cebaf Center — 09:00 - 09:05
- Introduction to SANPC — Amber Boehnlein et al. — Auditorium, Cebaf Center — 09:05 - 09:20
- MUSES — ...ew Manning et al. — Auditorium, Cebaf Center — 09:20 - 09:40
- ENAF — W Raphael Hix — Auditorium, Cebaf Center — 09:40 - 10:00

10:00
- NUCLEI — Thomas Papenbrock — Auditorium, Cebaf Center — 10:00 - 10:20
- Break — Atrium, Cebaf Center — 10:20 - 10:50

11:00
- BAND — Kyle Godbey — Auditorium, Cebaf Center — 10:50 - 11:10
- JETSCAPE — Abhijit Majumder — Auditorium, Cebaf Center — 11:10 - 11:30
- QuantOm — Ian Cloet — Auditorium, Cebaf Center — 11:30 - 11:50
- SciDAC FastMath — Todd Munson — Auditorium, Cebaf Center — 11:50 - 12:10

12:00
- Infrastructure for Nuclear Nonproliferation Data Science Res... — Paul Adamson — Auditorium, Cebaf Center — 12:10 - 12:30
- Lunch — Cebaf Center — 12:30 - 13:30

13:00
- Exp - Collider (RHIC, LHC, EIC) — Mateusz Ploskon — Auditorium, Cebaf Center — 13:30 - 13:55

14:00
- Exp - JLab/FRIB — Sean Liddick — Auditorium, Cebaf Center — 13:55 - 14:20
- Computing for Neutrino Physics — Jason Brodsky — Auditorium, Cebaf Center — 14:20 - 14:45

15:00
- Break — Atrium, Cebaf Center — 14:45 - 15:15
- JLab Angular Momentum (JAM) — Wally Melnitchouk — Auditorium, Cebaf Center — 15:15 - 15:35

Funded collaborations

Adjacent agencies

Experiments

15:00
- Atrium, Cebaf Center — 14:45 - 15:15
- JLab Angular Momentum (JAM) — Wally Melnitchouk — Auditorium, Cebaf Center — 15:15 - 15:35
- LQCD — William Detmold — Auditorium, Cebaf Center — 15:35 - 16:05

16:00
- iQUS — Martin Savage — Auditorium, Cebaf Center — 16:05 - 16:25
- Community-driven repositories of knowledge — Kyle Godbey — Auditorium, Cebaf Center — 16:25 - 16:35
- Sharing simulation data with community — Chun Shen — Auditorium, Cebaf Center — 16:35 - 16:45
- Maintaining and Refactoring Legacy Code — Abraham Flores — Auditorium, Cebaf Center — 16:45 - 16:55

17:00
- Challenges in non-equilibrium many-body dyna... — Aurel Bulgac — Auditorium, Cebaf Center — 16:55 - 17:05
- HPC and Quantum Computing in Nucl... — Joseph Carlson — Auditorium, Cebaf Center — 17:05 - 17:15
- QMC calculations of nuclear responses: beyond Carbon — Lorenzo Andreoli — Auditorium, Cebaf Center — 17:15 - 17:25
- ML for [high-energy] Nuclear Physics — Mateusz Ploskon — Auditorium, Cebaf Center — 17:25 - 17:35
- Neural Network for low-energy nuclear structure — Alex Gnech — Auditorium, Cebaf Center — 17:35 - 17:45
- Optimization with Correlated Errors — Ron Soltz — Auditorium, Cebaf Center — 17:45 - 17:55

18:00
- TListSpectrum: toolset for spectroscopic analysis — Heather Garland — Auditorium, Cebaf Center — 17:55 - 18:05

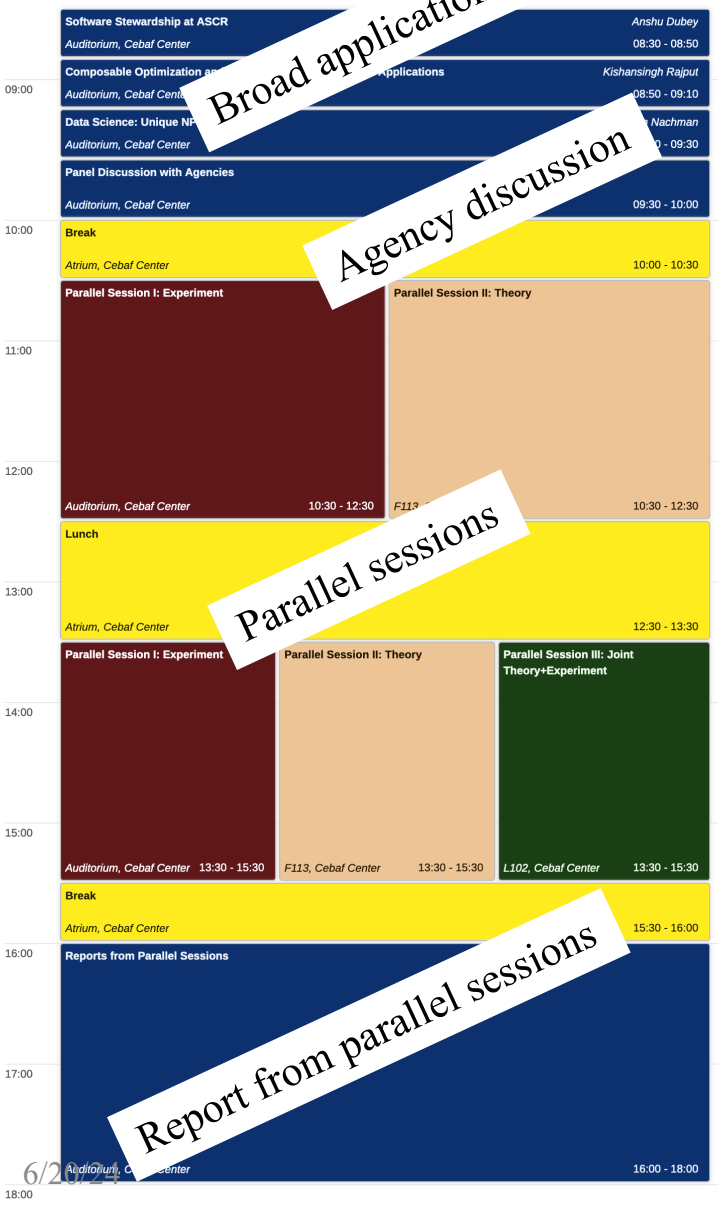
Funded collaborations

Open mic

19:00
- Welcome Event — Atrium, Cebaf Center — 18:15 - 20:15

20:00

Agenda Friday 6/21



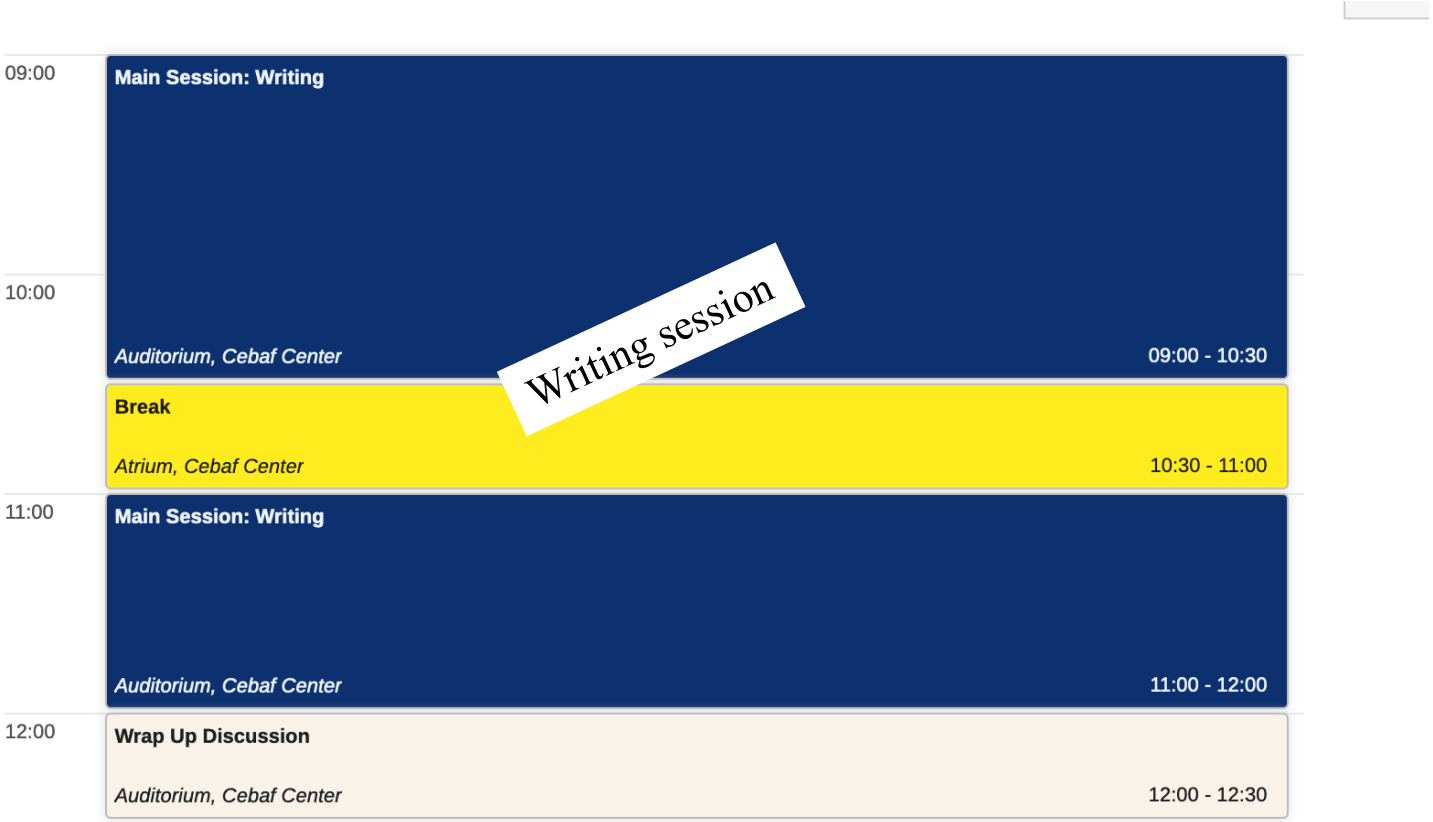
Parallel session convenors

Theory: Claudia Ratti, Kostas Originos

Experiment: Markus Diefenthaler, Mateusz Ploskon

Joint Theory+Experiment: Kyle Godbey, Ron Soltz

Agenda Saturday 6/22



Goal: consensus draft of White Paper main bullets + supporting text

Final comments

This workshop is an experiment. It is up to us collectively to figure out how to make it work efficiently and productively

- aim for open and in-depth discussion
- but there is a lot to cover: agenda is (necessarily) packed

Plenary session chairs should let discussion run within reason, but extended discussion should be tabled for the parallel sessions

- charge to parallel convenors: keep track of such discussions and incorporate into parallels as appropriate

Goal for Saturday noon: workshop consensus of main bullets and (brief) supporting text

Post-workshop: writing of full White Paper

- Overleaf, structured and delegated as needed
- Time scale ~2 months (?)
- Last point of discussion on Saturday: next steps

Thanks for support:

Office of Nuclear Physics and ASCR