



**A Coordinated Ecosystem for HL-LHC Computing R&D**

# Discussion Organization

Peter Elmer - Princeton University

# Questions to address at this workshop

1. How does the ensemble of US Software R&D efforts fit together to implement the HL-LHC Software/Computing roadmap described in the Community White Paper and meet the challenges of the HL-LHC? Which areas are not covered by US R&D efforts?
2. How do the US Software R&D efforts collaborate with each other and with international efforts? How do these efforts align with and leverage national exascale, national NSF OAC priorities and trends in the broader community?
3. How should the US R&D efforts be structured and organized in order to impact planned updates (all in ~2021/2022) to the HSF Community White Paper, the software/computing part of the US Snowmass process and HL-LHC experiment-specific software/computing TDRs?

# CWP Topic Areas

- Data Analysis Systems
- Reconstruction and Trigger Algorithms
- Applications of Machine Learning
- Data Organization, Management and Access
- Simulation
- Storage infrastructure and Facilities
- Data Transfer and networking infrastructure
- Workflow and Resource management
- Event Processing Frameworks
- Data and Software Preservation
- Physics Generators
- Visualization
- Software Development, Deployment and Validation/Verification

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# CWP Topic Areas - Discussion Facilitators

- Data Analysis Systems + Data and Software Preservation - Gordon Watts/Mike Hildreth
- Reconstruction and Trigger Algorithms - David Lange
- Applications of Machine Learning - Paolo Calafiura
- Data Organization, Management and Access - Brian Bockelman
- Simulation - Jim Amundson
- Storage infrastructure and Facilities - Torre Wenaus/Oli Gutsche
- Data Transfer and networking infrastructure - Rob Gardner
- Workflow and Resource management - Kaushik De
- Event Processing Frameworks - Liz Sexton-Kennedy
- Physics Generators - Taylor Childers
- Visualization - Volunteers?
- *Training* - Sudhir Malik

# Examine the R&D Portfolio

- Which US R&D projects are working in this area?
- Are there international efforts?
- What is the FTE effort levels for each US project?
- What are the goals of each R&D project?
- Is the R&D connected to the Experiments and/or the Operations programs?

# Analyze Scope and Organization

- How do the goals of the R&D projects align? (Overlapping? Complementary?)
- Do they cover the important challenges? (See “Scope and Challenges” for the relevant chapter in the CWP.)
- Are the R&D projects organized to succeed?
- Are there important areas in this topic area that are not covered?
- SWOT Analysis of the Portfolio and its organization
- Gap Analysis (likely impact vs potential impact)

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# Desirable outcomes for closeout presentation and report?

- Big picture of coverage of important CWP topics
- Status of USATLAS - IRIS-HEP - USCMS (- OSG) collaborations
- CCE and ECP
- Opportunities and Weaknesses
- Timeline