COMPUTATIONAL FRONTIER

Frontier Conveners

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SUBGROUPS

- CompF1: Experimental Algorithm Parallelization (reco/calib, CPU utilization & acceleration, new algos)
- CompF2: Theoretical Calculations and Simulation (also event generators, detector sim, accelerator sim, cosmic frontier sim)
- CompF3: Machine Learning (training and inference, calibration and validation, see more on next slide)
- CompF4: Storage and processing resource access (Facility and Infrastructure R&D, includes specialized AI hardware)
- CompF5: End user analysis (facilities, accelerators, libraries, data formats, languages, version control, long-term preservation)
- CompF6: Quantum computing (impact on our community)
- CompF7: Reinterpretation and long-term preservation of data and code (public data, tools for combining and for archiving)

COMPF3: MACHINE LEARNING SUBGROUP

- Thinking about role in HEP for next 5-10 years
- ML on FPGAs (fast inference) could be more relevant for another topical group (e.g. our TDAQ subgroup)
- Held first community meeting on May 26th
  - Interested groups gave quick 1-slide introductions of their members and interests
- Developed a document on themes:
  - Physics-specific ML, Interpretability and validation, Community tools and standards, Resource needs and management, Education and engagement, Case studies: the role of ML in HEP

Lot of interest there for courses/tutorials geared for our field

GENERAL COMMENTS ON COMPUTATIONAL FRONTIER

- Largest overlap within the Instrumentation Frontier is probably with the TDAQ subgroup
  - e.g. parallelization of algorithms and acceleration (CompF1), Machine Learning (CompF3), Storage and processing resources (CompF4)
  - Main differences are in processing latencies and in distributed computing aspects
- Focus of Computing groups is on the next 10-15 years
  - So not explicitly the future facilities after DUNE, HL LHC, LSST, …
  - Liaisons are asked to let the Computing group know if there are requirements to develop R&D directions for beyond
- They plan to reach out also for funding agencies to discuss what will be helpful, and to P5

GENERAL COMMENTS ON COMPUTATIONAL FRONTIER, CONT'D

- Conveners have met 5 times already (plus some subgroups have met)
- Groups are working on a survey of computing workflows across the Frontiers and plan a discussion soon
- Organizing a dedicated 2-day virtual workshop on Aug.10-11
  - https://indico.fnal.gov/event/43829/
  - Planning a cross-frontier session in this upcoming workshop
- Finally, if you are interested in any of these topics, please join the topical groups in the computing frontier!