CHARGE FOR THE FERMILAB PAC MEETING
JUNE 2023

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(1) Report from the LBNC

Charge: for information only.

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(2) Report from the Accelerators Directorate

Charge: for information only.

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(3) Strategic Plan for Software and Computing Program at the Laboratory

Charge: We ask the PAC to review the strategic planning for Software and Computing at the laboratory: The committee is asked to review the plan in the context of Fermilab as host lab for large collaborations (DUNE and USCMS) and for its scientific and technological competitiveness. The PAC is also asked to review the status of the recommendations from previous reviews:

1. Following up on the recommendation from the last PAC, we recommend that the Laboratory develops a strategic computing plan based on the experiments' needs. The plan should project computing and storage resources that will be made available to the experiments, as well as central services like power and cooling. The plan should include a timeline and milestones for critical technology decision points e.g. the integration of heterogeneous computing resources provided by US HPCs and the role of commercial clouds.

2. [made to the g-2 Collaboration] We encourage SCD and the g-2 computing experts to further improve their level of collaboration, focusing on reducing the turnaround time in g-2 data processing.

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(4) Report from the Microelectronics Program at the Laboratory

Charge: The PAC is asked to review the strategic plan for upcoming microelectronics center bids. The PAC is also asked to review the recommendations from previous reviews:

1. Efforts in the area of fast-inference-on-chip, which Fermilab leads and is uniquely placed to follow early implementation in running experiments, are prioritized;
2. The Laboratory management, ETD, and Microelectronics group develop a strategic plan for upcoming microelectronics center bids, including a forward vision for consolidating strengths and development of new thrusts unique to Fermilab. Such a plan should consider the option of incorporating the synergistic elements of the AI/ML program into the microelectronics center bid;
3. The Laboratory continues its full support of the ASIC development group in completing its current commitments to the HL-LHC upgrade.

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(5) Overview of the Theoretical Physics Program at the Laboratory

Charge: We ask the PAC to review the status of the theoretical physics program and the readiness of the laboratory for the upcoming DOE Comparative Review. The PAC is also asked to review the status of the recommendations from previous reviews:

1. The PAC recommends that the Lab provide the Theory Division with the requested support.
2. The Lab and the Theory Division should maintain close connections to the University community and ensure that the programs it is offering are welcomed by the community, as opposed to being seen as securing a larger piece of a small pie.

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(6) Overview of the LHC Physics Center

Charge: The PAC is asked to review the status of the LHC physics center (LPC) and of the recommendations from previous reviews:

1. Essential facts about the structure of the LPC and its successes be disseminated in a concise document, which can be useful to the Center itself, and to other communities that may want to replicate the ideas.
2. Given the Center's unique role in training and in creating networks among CMS scientists,
   the LPC compile information about the degree of participation in and benefit from LPC programs among scientists from smaller US-CMS institutions, underrepresented demographic groups in the US, and nations with low representation in CMS.

3. The LPC management team continue its efforts on all fronts to maintain the operations of the Center, which requires that the budget is not further decreased, and is ideally increased to better serve more early career researchers.

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(7) Overview of the Neutrino Physics Center

Charge: The PAC is asked to review the status of the Neutrino Physics Center (NPC), its function as center of the host laboratory for LBNF/DUNE, its role and impact within the domestic and international neutrino community. We ask the PAC to also evaluate whether the NPC could serve as a platform to coordinate and prioritize software and computing efforts, including those in data preservation.

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(8) Overview of the Cosmic Physics Center

Charge: The PAC is asked to review the status of the Cosmic Physics Center (CPC), its role and impact within the domestic and international community.

(9a) Report from the Mu2e experiment

Charge: The PAC is asked to review the recommendation from previous reviews:

1. The PAC recommends the experiment monitor at a regular pace a resource loaded schedule for all items needed to be ready for data taking with clear "need by" dates.

(9b) Overview of the physics for Mu2e II experiment and foreseen R&D needs

Charge: The PAC is asked to review the physics case for the Mu2e II experiment and the foreseen R&D needs.

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(10) Summary of the Spin Quest ORR

Charge: The PAC will be asked to review the recommendation from previous reviews:

1. The PAC recommends that laboratory management comprehensively review the issues with respect to SpinQuest readiness for operation and resourcing for the SpinQuest Upgrade.

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(11) Overview of the proposed ACE at Fermilab

Charge: The PAC will be asked to review the process for community engagement, identification of the science goals, development of alternative concepts and functional requirements.