The quest to understand the fundamental building blocks of nature, and their interactions, is one of the longest running and most ambitious of human endeavors. Facilities such as the Large Hadron Collider (LHC), where we do our research, represent a huge step forward in our ability to answer these questions. The discovery of the Higgs boson, the observation of exceedingly rare decays of B mesons, and exclusion of countless theories beyond the Standard Model (SM) of particle physics demonstrate that these experiments deliver results. However, the most interesting fundamental physics questions remain wide open, amongst them: What is the dark matter which pervades the universe? Does space-time have additional symmetries or extend beyond the 3 spatial dimensions we know? What is the mechanism stabilizing the Higgs mass from enormous quantum corrections? Are neutrinos, whose only SM interactions are weak, their own anti-particles? Can the theories of gravity and quantum mechanics be reconciled? Planned and running HEP experiments aim to answer these questions over the next 20 years.

Interoperability
Improve the interoperability of HEP tools with the larger scientific software ecosystem, incorporating best practices and algorithms from other disciplines into HEP.

Better Software
Develop software to effectively exploit emerging many- and multi-core hardware. Promote the concept of software as a research product.

Training
Provide training for students in all of our core research topics.

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