



Applied Mathematics and Fluid Dynamics

LANL has an extraordinarily rich scientific tradition of applied and scholarly research contributions in the fields of mathematics, fluid dynamics, and particle transport. Our impressive breadth of research impact speaks to this history, but also to the present and future with the significant integration of world-class theory, modeling, computational science, and experimentation. The collection of articles in this section underscores the breadth and depth of these seminal capabilities: from a new high-performance simulation tool for modeling important physical processes within a nuclear reactor, new methods applied to the understanding of engine combustion, multiple advances in the understanding of turbulent flow through direct numerical simulations, to advanced new methods that enable more accurate and faster hydrodynamic simulations with a variety of complex geometric and mathematical constraints. This sampling of work represents a much larger corpus of scientific capabilities embodied in complex multi-physics simulations that run on the largest supercomputers in the world for a host of national security, energy, and scientific programs.