1036-76-31 **Brian Fix*** (bfix@ams.sunysb.edu), Stony Brook University, Department of Applied Math & Statistics, Math Building, Stony Brook, NY, **James Glimm** (glimm@ams.sunysb.edu), Stony Brook University, Department of Applied Math & Statistics, Math Building Room P-138A, Stony Brook, NY, **Justin Iwerks**, Stony Brook University, Department of Applied Math & Statistics, Math Building, Stony Brook, NY, **Ryan Kaufman**, Stony Brook University, Department of Applied Math & Statistics, Math Building, Stony Brook, NY , and **Xiaolin Li**, Stony Brook University, Department of Applied Math & Statistics, Math Building, Stony Brook, NY. *The Benchmark of FronTier Library and its Applications to Scientific and Engineering Problems.*

The front tracking method has been evolved into a mature numerical method for computations with dynamically moving manifolds. We will first introduce several important new developments on the front tracking method. This includes the simplification of the FronTier library for general purpose scientific computation, the robust algorithms for topological bifurcation and its interoperability with other scientific programs such as AMR. We will compare the FronTier library with different interface methods through benchmark problems to show that this is a high quality software package. We will demonstrate the link of this library to several scientific problems including fluid mixing, crystal growth, cell motion, fluid and rigid body interaction, supernova explosion, among other applications. (Received December 07, 2007)