Turbulence Simulation using many Graphics Processors[1] ALI
KHAJEH-SAEED, J. BLAIR PEROT, University of Massachusetts Amherst, Mechanical and Industrial Engineering, Amherst, MA 01003, United States — Unsteady simulations of turbulence are performed using up to 64 graphics processors
on the NSF XSede supercomputer, Lincoln, located at NCSA. For a 512^3 simulations
the performance of 16 GPUs (Tesla S1070) is about 45 times faster than that obtained with the same number of CPU cores of quad-core Intel Harpertown processors
on the same machine. The code is optimized to use the fast shared-memory on the
GPUs and to use communication/computation overlapping. Results show that the
computation time is now so fast that even for large problems, with up to 8 million
unknowns per GPU, the MPI communication time controls the scaling behavior of
the CFD algorithm.

J. Blair Perot
University of Massachusetts Amherst, Mechanical and Industrial
Engineering, Amherst, MA 01003, United States