

## CUTTING-EDGE HIGH-PERFORMANCE COMPUTING FACILITY

In the era of exponential growth in computational power, engineering-based simulation using high performance computing is transforming our research philosophy by enabling the modeling of arbitrarily complex flow dynamics across a broad range of scales. Coupled with our state-of-the-art experimental facilities—i.e. large-scale flume of wave and current—our computational fluid dynamics capabilities uniquely position us to make far-reaching advances in the major societal problems of our time in energy, the environment and human health.

Civil Engineering Department has recently commissioned a high performance computing cluster, denoted as “Zagros”, which is housed at the Center of Excellence in Wireless and Information Technology (CEWIT) of Stony Brook University. Zagros is equipped with execution and compute nodes connected by low-latency/high-throughput local interconnects (InfiniBand). This supercomputing cluster is a 76-node Intel Xeon E5-2670 which contains 1,216 cores. Each node has 128GB RAM and for a total of 9.728TB memory system wide. Each node is connected via 40Gbps InfiniBand network for intranode communications. Storage for the cluster is a Lustre system with 72GB usable and connected via InfiniBand.

Examples of projects using our high performance computing includes ongoing simulation-based research aimed at understanding how turbulent flow affects sediment transport in natural waterways; wave, current, and structure interaction; optimizing hydrokinetic turbine layouts; and modeling transport of pollution by air and water in real-world settings. See under “Current Research” on our website <http://www.stonybrook.edu/commcms/civileng/> for the latest research performed by Zagros.

