1086-68-2981 **Barna L Bihari*** (bihari@llnl.gov), Lawrence Livermore National Laboratory, L-557, 7000 East Avenue, Livermore, CA 94550. *Computing on Sequoia: The Search for Synergy Between Algorithms and Hardware.*

Having co-designed and successfully installed Sequoia, the fastest supercomputer in the world comes with its own set of challenges and responsibilities for Lawrence Livermore National Laboratory. The efficient use of a 1.6 million core massively parallel system requires not just a fast and novel hardware design, but also modifications to, and occasionally replacement of, the existing mathematical algorithms. There is an increasing amount of empirical evidence that not just the code developer, but the applied mathematician as well as the numerical analyst needs to be aware of the computer hardware which is becoming increasingly innovative, complex, and heterogeneous. To this end, we will introduce and present some experiments with transactional memory (TM) which, for the first time, is implemented in hardware on IBM's Blue Gene/Q architecture. We will discuss the algorithmic as well as the performance implications of TM, concluding with computational results. (Received September 26, 2012)