ROB - Robust and Easily Programmable Distributed Supercomputing

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**Job description:** Take a cluster of one thousand networked compute nodes, each equipped with one or two state-of-the-art GPGPU cards, and you have a petaflop-scale supercomputer (millions of execution cores each running at about one gigaflop). But what if one of the nodes fails in the middle of a computation? And are such machines difficult to program in a manner that is robust to failures? This project seeks to find out, though with resources somewhat more modest than a petaflop machine. Our intent is to play with a few such nodes and explore where we end up in performance terms and programming convenience using off-the-shelf, failure-tolerant cluster-computing tools to guide GPGPUs through numerical workloads.

Students with some background in cluster computing tools such as Apache Spark and/or GPGPU programming with CUDA or OpenCL are especially encouraged to apply. Programming skills and familiarity with the Unix environment are required.