**Efficient Utilization of Large-Scale Heterogeneous Systems Using the Uintah Computational Framework**

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We'll discuss how directed acyclic graph (DAG) approaches provide a powerful abstraction for solving challenging engineering problems and how using this abstraction and DAG approach, computational frameworks such as Uintah can be extended with relative ease to efficiently leverage GPUs, even at scale. Attendees will learn how frameworks like Uintah are able to shield the application developer from the complexities of the deep memory hierarchies and multiple levels of parallelism found in heterogeneous supercomputers. Attendees will be shown how Uintah applications can be made to utilize thousands of GPUs within a single simulation, as shown by recent results for a GPU-based radiation model that achieves excellent strong scaling to 16,384 GPUs on DOE Titan.