Overview

The heart of every computer is the Central Processing Unit (CPU). All computer operations are handled by this little chip. The faster the CPU, the faster the programs will run. Because of technical restrictions, the CPU is limited to make only one calculation at a time or, if the CPU has multiple cores, times n.

LucidShape already takes advantage of multiple CPU cores by efficient multithreading, but why not use additional graphics power?

Graphics Processing Units

Every modern graphics card has a Graphics Processing Unit (GPU) on board that can have up to 1,536 small processors that are optimized to do geometrical calculations. LucidShape's GPUTrace technology uses those processors to accelerate optical simulations.

What is very promising about current GPU technology is that during the last few years, GPUs have gained calculation power much faster than CPUs, as you can see in the figure to the left.

Significant Performance Improvements

We benchmarked real-life models with our state-of-the-art multithreaded simulation method, using the fastest Intel multi-core CPU available. Then we compared it with the most recent NVIDIA Fermi graphics card on the same machine.

Using GPUTrace, we experienced a reduction in simulation time by a factor of up to 30, compared to the multicore simulation. That means the GPU simulation can be 30 times faster than a CPU simulation on 8 cores. If your simulation speed is that fast, you can spend more time improving your illumination designs, rather than waiting for simulations. Demanding applications, such as ray tracing light pipes, can greatly benefit from this simulation acceleration.

Hardware Requirements

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