

High Performance Computing – ArTeCS group



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■ ArTeCS Group Interest

■ GPGPU

■ Algorithm/Application mapping

■ OS – Chip multithreading

■ Smart scheduling

■ GPGPU (since 2004)

■ ArTeCS GPGPU Framework

- CUDA made it outdated before it was fully completely ...

■ Experience on Application Mapping

- Hyperspectral imaging
- Bioinformatics

■ Current Vision

- GPGPU and Chip multi-threading seems to converge

■ Goals:

- **To improve understanding** of the effects that traditional optimizations have on the new platforms.
- **To devise models and heuristics** that allow us to prune the optimization space and efficiently guide code optimization process.

GPGPU - More Information

- **"Parallel implementation of the 2D Discrete Wavelet Transform on Graphics Processing Units: Filter-Bank versus Lifting", IEEE Transactions on Parallel and Distributed Computing, Vol. 19, No. 3, March 2008**
- **"GPUs for Parallel On-Board Hyperspectral Image Processing", International Journal of High Performance Computing Applications, Vol. 22, 2008**

OS- Chip multithreading Interaction

- **Scheduling for chip multi-threading systems**

- We have just started collaborative research effort in the area of task scheduling for many-core architectures with Sasha Fedorova's SyNAR Lab – Simon Fraser University, BC, Canada