

*IEEE Computational Intelligence Society MU Chapter
and
National Library of Medicine Medical Informatics Training Grant
Special Seminar Series*

Speed-up of Algorithms With Graphical Processing Units

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Dates and Time: Friday October 27, November 3, 10, 17 at 2:00 PM
Dates after Oct. 27 are somewhat tentative at this time
Place: W1004 EBE – room outside of Ketcham Aud. (Oct 27 and Nov 10)
249 EBW (Nov 3 and Nov 17)

Course Content

From intellectual curiosity, and a need to make multiple diverse algorithms run in near real time for their NLM and other research projects, Derek and Bob have been studying the adaptation of Graphical Processing Units (GPUs) to non graphics tasks. Their success in this endeavor is now a general resource for us at MU. Since they have been getting requests to explain the details from several sources, we decided that the best approach would be for them to create a “short course” on the subject. They have broken it down into four sessions with the topics listed below. This will not be a set of “hand waving” presentations, but instead will contain practical information from which you can learn how to cast your favorite algorithm into a GPU fireball.

1) Introduction to GPUs –

Motivation, application domains (gaming, film, general purpose computation), resources, history, vendors & models, architecture, graphics pipeline, parallelism and pipelining, CPU vs. GPU (growth & development), host driver (OpenGL and/or DirectX), ARB extensions, Shader languages (Cg, GLSL, HLSL), and common GPU operations (linear algebra)

2) Using a GPU for image processing (programming kernels) - noise removal, edge extraction, color conversion, and post processing. Example - Morphology in Cg

3) GPU debugging and performance (Frame Buffer Objects, optimizations, environment,)

4) Using a GPU for non-image based processing. Example - Self Organizing Feature Map