Welcome to DD2360!

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GPUs and the Future of Computing

- For decades, HPC clusters with traditional processors have been the golden standard for expanding **computing capability frontiers**
- In 2012, computer scientists at University of Toronto, demonstrated a way to advance computer vision using deep neural nets running on GPU[1]
  - This advance proved revolutionary
- The use of GPUs is now moving into the **mainstream** of computing

[1]Krizhevsky, Alex, Ilya Sutskever, and Geoffrey E. Hinton. *Imagenet classification with deep convolutional neural networks.* In *Advances in neural information processing systems*, pp. 1097-1105. 2012.

Why a Course on Applied GPU programming?

- There are very few people with **expertise in both application domains** (graphics, imaging, deep learning, scientific computing, …) **and GPU programming**.
- As GPUs become a **mainstream computing platform**, there is a need for professionals who understand the GPU advantages - but also the limitations – and are capable to write code for solving problems with GPUs.

Objectives

- Our goal is to prepare you to **write efficient code for programming GPUs** to solve problems in your application domain.
- We target the specific objective of doing HPC with GPUs:
  - Basic CUDA
  - Advanced CUDA
  - OpenACC
- At the end of this course, you will be able to apply these techniques to your specific application