

CS 179 Project

Intro

Two Choices

- (1) 5 sets, 5 week project for 50% of grade
- (2) 7 sets, 3 week project for 30% of grade

Projects can be done solo or with team of 2.

What we want from your project

- challenge yourself (& demonstrate what you've learned in the class)
- have fun (make something that excites you)

Open Source (optional)

To make your hard work more useful to the world, open source it!

If it makes sense, you can contribute to an existing library or make your own library/application for others to use.

What you get from the project

- skills & experience
- hopefully something impressive to put on your resume
- a grade in CS 179

Project idea: GPU applications

Implement an algorithm or build an application.

Computer vision, machine learning, bioinformatics, signals processing, numerical methods, optimization, graphics, finance, ...

Choose a topic you have some background in (or want to get some background in)!

Other applications

networking, databases, streaming algorithms

Not done as often on GPUs, which means there's lots of new things to try that might work well :)

Project idea: HPC

Develop your own high performance implementation of a common algorithm.

NVIDIA's libraries are closed source, but can be fun to reverse engineer :)

Ideas: matrix multiplication, FFT, linear system solving, eigenvalue calculation, SVD, sparse matrices

Project idea: GPU tools

- GPU emulator (test CUDA code without having a GPU)
- write CUDA kernels in another language (might not be too bad if language already uses LLVM)

Potentially requires a lot of background in systems, software analysis, compilers.

Project idea: data collection

Example: What is the latency and throughput of every instruction on the GK110? (design and execute an experiment to collect these numbers)

Produce something similar to agner.org optimization documentation.

Other resources for project ideas

- [talks](#) from NVIDIA's GTC conference
- Carnegie Mellon's parallel architectures course projects: [ideas](#), [2014](#), [2013](#), [2012](#)
- [GPU Gems 3](#)
- [Parallel Forall blog](#)

Deliverables

- Project proposal
- weekly (very brief) updates
- Final code
- Final report
- Presentation (optional for 3 week projects)

Timeline

April 22nd (next Wed) - details on proposal, “speed dating”,
instructors pitch a few ideas

April 27th - 5 week proposal due

May 11th - 3 week proposal due

May 29th - CMS Celebration of Undergraduate Research
(presentation opportunity)

June 3rd - report due

June 3rd & 5th - presentations