

# Optimizing GPU kernels: Convolution

Erik Saule

## 1 Basic Convolutions on GPU

**Question:** Port the convolution kernel to the GPU.

**Question:** Benchmark its performance using different image size and convolution dimension. (Ignore pci-express transfer in measurement)

**Question:** What is the expected performance?

## 2 Optimizing convolution

**Question:** Optimize the convolution kernel. In particular be mindful of

- Occupancy
- Coalescing
- Shared memory (and bank conflicts)

**Question:** Benchmark performance of optimized kernel. How does that compare to the previous version and to expected performance? How close can you get?