AnySP: Anytime Anywhere Anyway Signal Processing

Overview
- Energy is the biggest constraint in comparison to the GPU paper we read
- A lot more image processing compared to the past
- Today's smartphones have processors, signal processing accelerators, etc.

Power/Performance Graph
- TI C6X is unique in power/performance requirement graph since it is very power efficient due to being a VLIW processor. To handle 4G wireless, we need 1000Mops/mW.
- This paper talks about what takes to make from SODA to 4G.

H264 Basics
- A well mix of parallelism and dependencies
- Decomposition and image smoothing are done.

4G Wireless Basics
- Composed of FFT, STBC, LDPC

Mobile Signal Processing Algorithm Characteristics
- Authors looked at the optimal SIMD width.
- Out of three parallelism we discussed (ILP, TLP and DLP), SIMD is DLP.
- The importance of SIMD, Scalar and Overhead workloads is the basic Amdahl's issue (the limiting factor).

Register File Access
- Register file access uses a significant amount of power
- A lot of unnecessary register accesses
- DSP algorithms have a lot of opportunities for instruction pairing

Conclusion
- Lots of different SIMD width needed
- Lots of instruction fusing potentials

AnySP Architecture
- Wider lanes
- The swizzle network is a key reason for performance improvement (bigger, better, easier to use)
- You need many AGU for many threads
- Crossbar at multibank local memory helps parallel memory accesses