

Challenges for Poly from My Perspective

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- Application to FPGAs
 - Can poly help with resource minimization, data reuse, performance optimizations?
 - Polyhedral-Based Data Reuse Optimization for Configurable Computing, Louis-Noel et al., FPGA 2013.
 - A polyhedral model-based framework for dataflow implementation on FPGA devices of iterative stencil loops. ICCAD 2016.
- High-Level Synthesis
 - Can poly help decide which regions to offload to custom hardware/accelerators?
 - Is there a quick way to prototype these systems without an army of VLSI design engineers?
 - Hardware Generation from the Polyhedral Model, Harald Devos et al., UGhent 2006.
 - Improving Polyhedral Code Generation for High-Level Synthesis, Wei Zuo et al., CODES+ISSS 2013.
- Thread-Level Speculation (and speculation in general)
 - Challenges still remain handling irregular, speculative, and non-affine codes
 - The Polyhedral Model of Nonlinear Loops, TACO 2016.
- Exascale, Datacenters and OpenCL
 - How is a program partitioned across a datacenter or supercomputer or heterogeneous system?
 - Is there a high-level language/abstraction that allows functional and performance portable code?