Elliott Kauffman

- *I am a 2nd year graduate student at Princeton University*
- *Mentors: Isobel Ojalvo (Princeton), Jennifer Ngadiuba (FNAL)*

My TAC-HEP R&D project:

My work focuses on developing power-efficient algorithms for event classification on the CMS detector. Recently there has been progress on using logic gates as a method for implementing highly efficient algorithms in CPUs, GPUs and FPGAs. I am working on developing an algorithm that attempts to make use of **logic gates**, allowing for a **fully quantized algorithm** which should **optimize performance and resource efficiency** when implemented on an **FPGA**.

Accomplishments:

- Developed a working example of the method we are exploring for the FPGA implementation using HLS, incorporating logic gate-based operations.

Next steps:

- Synthesis of the full FPGA design with calorimeter inputs
- Exploring optimization and conducting comparison studies with previous implementations

TAC-HEP Modules (& more)

Princeton COS217: Introduction to Programming Systems

- Modularity and abstraction in the C programming language
- ARM assembly language and machine language

TAC-HEP GPU Module

- Heterogeneous computing architectures
- How to program GPUs in CUDA, including thread and memory organization

TAC-HEP FPGA Module

- Learning how to go from a C program to FPGA implementation using HLS
- When to apply pragmas, what applications are best for FPGA