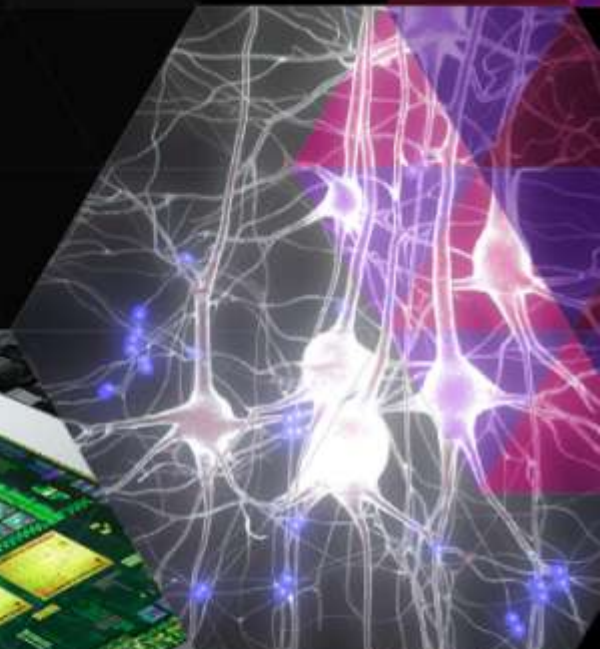
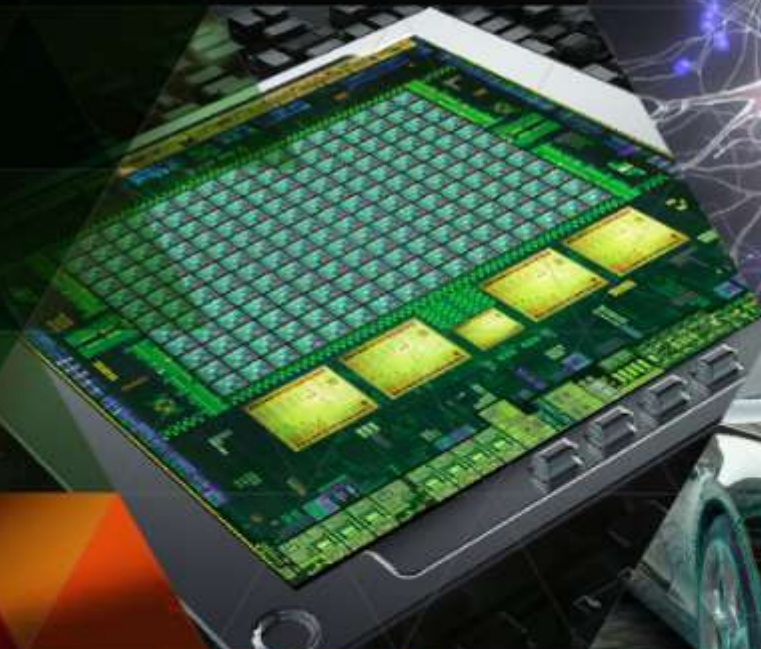
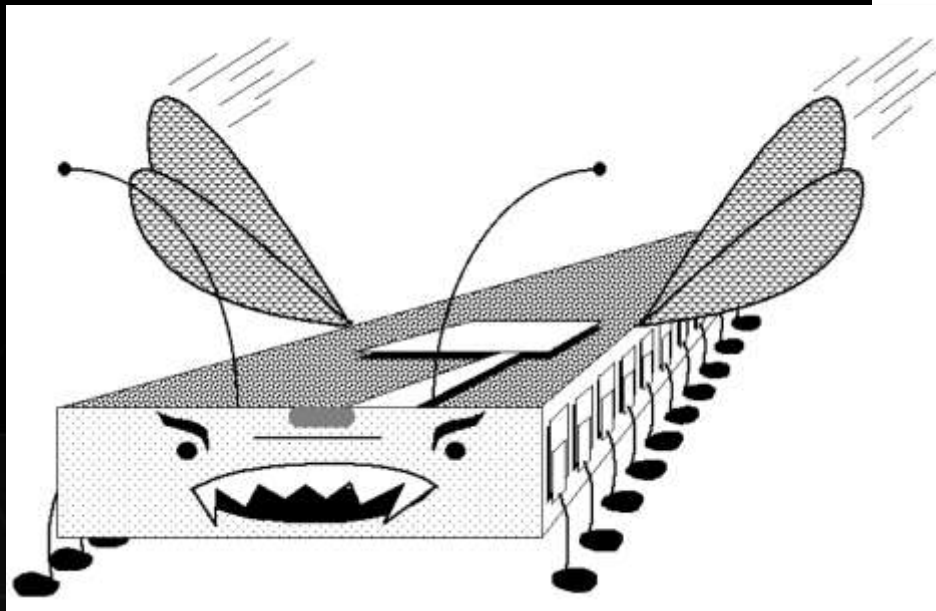




# MOBILE-DERIVATIVE TECHNOLOGY

Steve Oberlin  
CTO, Accelerated Computing





## The Attack of the Killer Micros

*E. D. Brooks III*

Massively Parallel Computing Initiative  
Lawrence Livermore National Laboratories

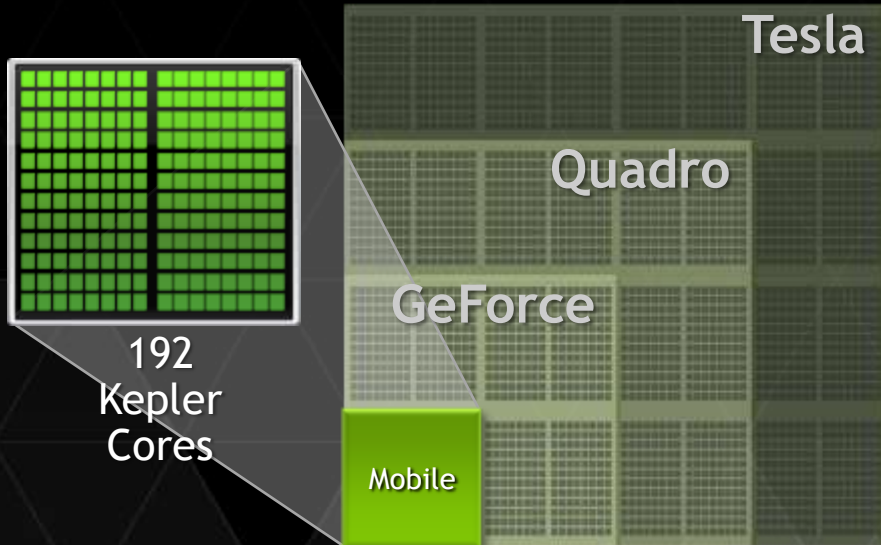
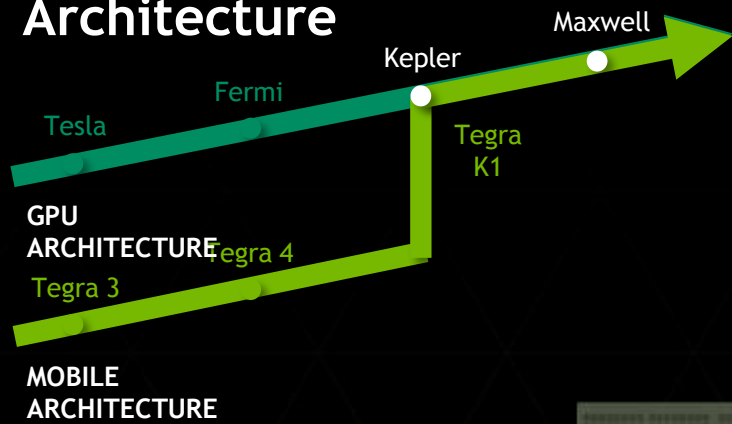
brooks@{maddog.llnl.gov, maddog.uucp}

Presented at: Supercomputing '89  
Reno, Nov 13-17 1989

COMING SOON:  
**ATTACK OF THE KILLER SMARTPHONE**

# TEGRA K1

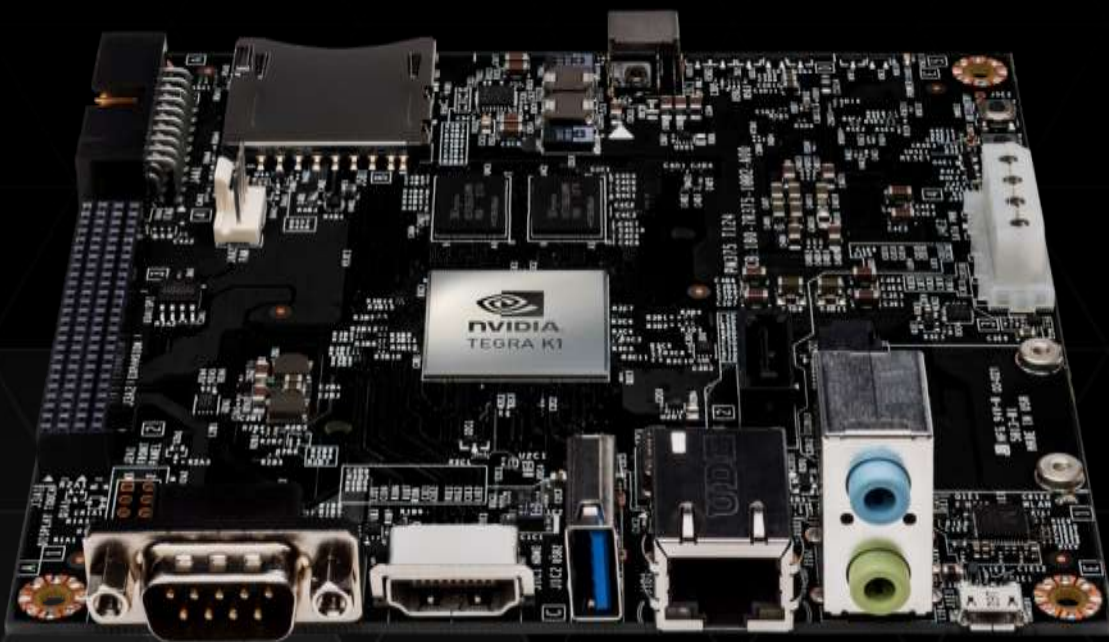
## Unify GPU and Tegra Architecture



CUDA Enabled

# JETSON TK1

Development Platform for Embedded Computer  
Vision, Robotics, Medical



192 Kepler Cores · 326 GFLOPS

4 ARM A15 Cores

2 GB DDR3L

16-256 GB Flash

Gigabit Ethernet

CUDA Enabled

5-11 Watts

\$192

Available Now

# “ATTACK OF THE KILLER SMARTPHONES?”

## ● K40 + CPU

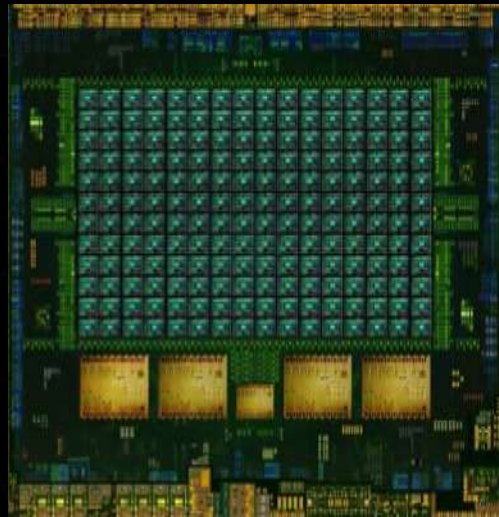
- Peak SP: 4.2 TFLOPS
- SP SGEMM: ~3.8 TFLOPS
- Memory: 12 GB @ 288 GB/s
- Power:
  - GPU: 235 W
  - CPU + Mem: 150 W
  - Total: 385 W
- Perf/Watt: ~10 SP GFLOPS/W

## ● TK-1

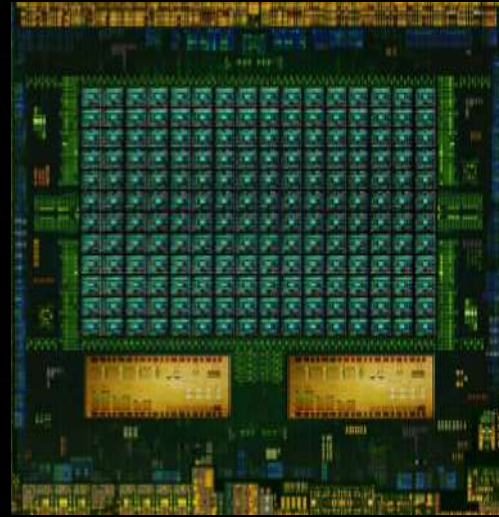
- Peak SP: 326 GFLOPS
- SP SGEMM: ~290 GFLOPS
- Memory: 2 GB @ 14.9 GB/s
- Power:
  - GPU + CPU: <11 W (working hard)
  - **1/35 of K40 + CPU**
- **Perf/Watt: ~26 SP GFLOPS/W**

For the same power as K40 + CPU, you could have  
10+ TFLOPS SP, 70 GB DRAM @ 500+ GB/s

# TEGRA K1: NOW IN TWO FLAVORS



←→  
Pin  
Compatible



Quad A15 CPUs

32-bit

3-way Superscalar

Up to 2.3GHz

32K+32K L1\$

Dual Denver CPUs

64-bit

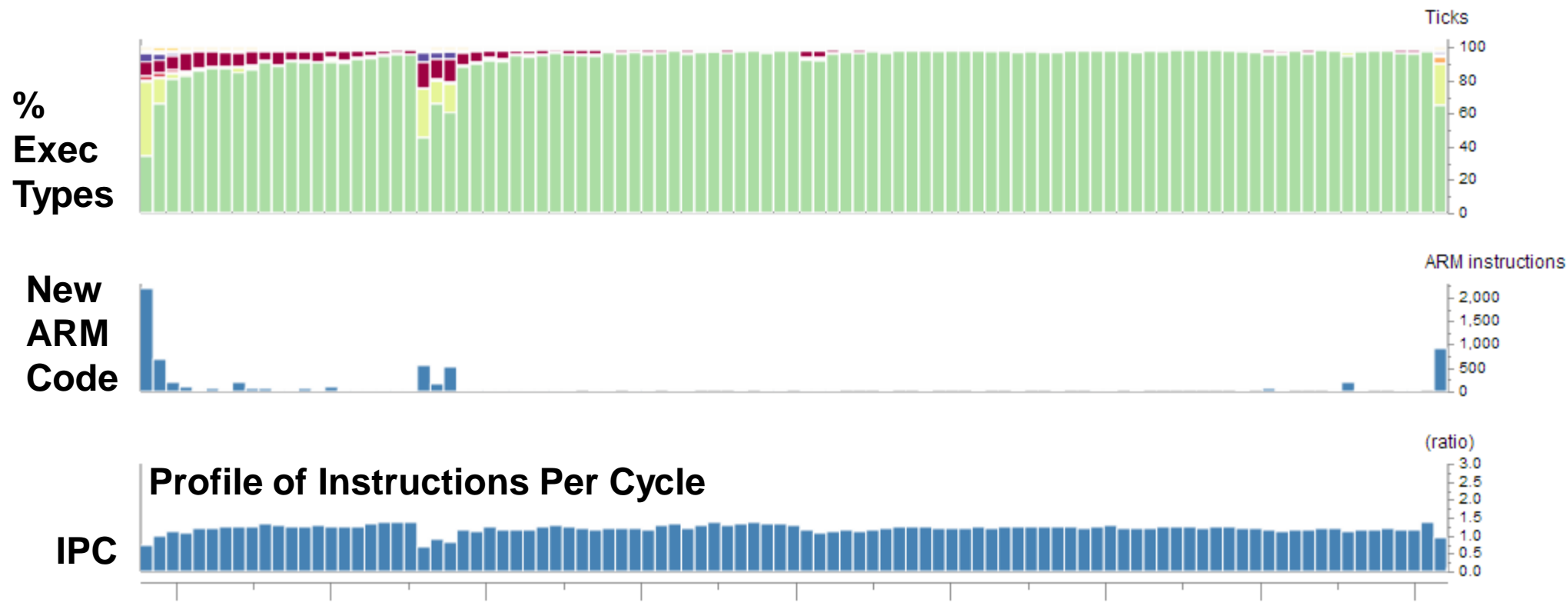
7-way Superscalar

Up to 2.5GHz

128K+64K L1\$

# DYNAMIC CODE OPTIMIZATION: SPECINT EXAMPLE

← Full benchmark run →



Optimized uCode Execution

ARM Decoded Execution

Optimizer Execution



# DENVER PERFORMANCE

