ACAR: Advancing Computer Architecture Research

- *What:* ACAR are CCC sponsored workshops designed to bring community consensus behind a research agenda

- *Why:* so that research communities and funding agencies will act.

- *Organizers:* Josep Torrellas, Mark Oskin
  Steering committee: Chita Das, Mark Hill, Jim Larus, Margaret Martonosi, Jose Moreira, Kunle Olukotun
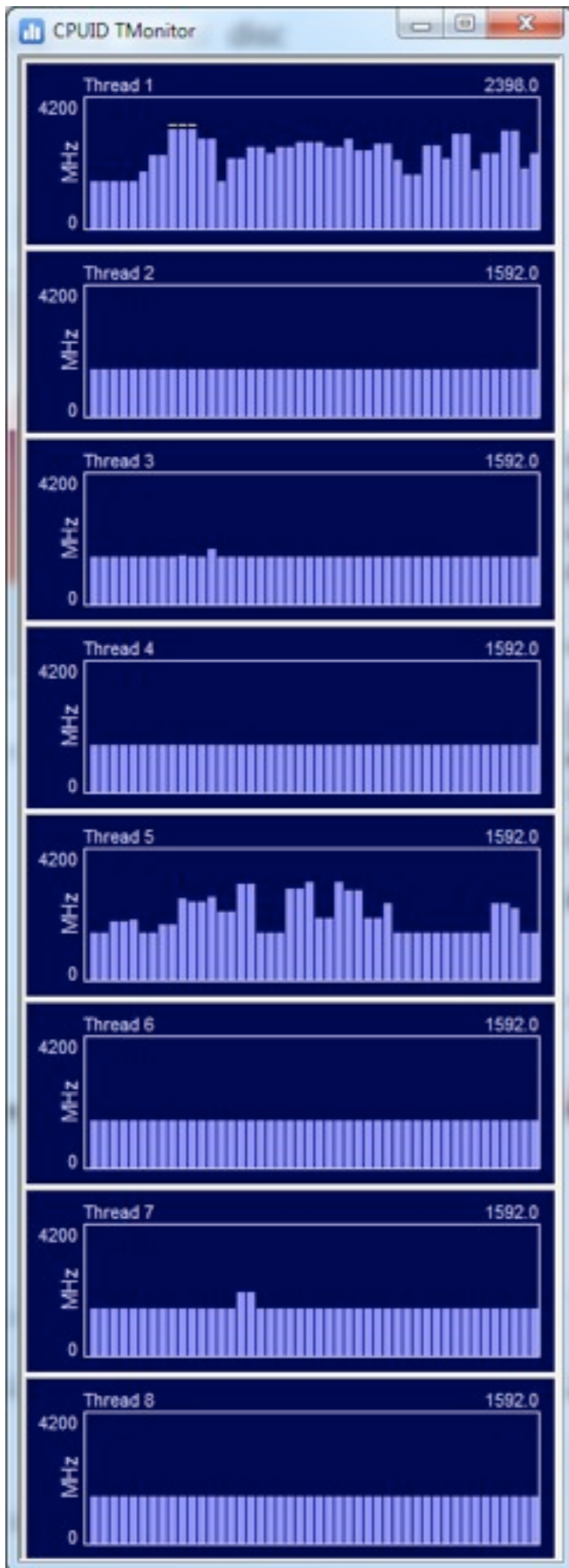
ACAR 1: Popular Parallel Programming

- Was Feb 22-23 in San Diego

- ~ 30 attendees

- Outcome: domain-specific languages, large-scale, programmability, specialization

- Report is in-progress

ACAR 2: What now in ILP?

- ***How:* Submit 1 page position statement ~ by July 20th.**

- *When:* Workshop is Sept 21-22nd

- *Where:* Seattle, there will be sun!

Microarchitecture dead?
Manycore, ... now that's idle on arrival!

Sooner or later the buying public will notice.

Engineer: "I know! We'll sell them a new feature to let them turn them off."

Marketing: "Brilliant! Brilliant! We can call it, ...wait for it, ...wait for it,.... TURBO BOOST!"

Are we ready to admit this is a failure?

```
hMutex = CreateMutex(...);
WaitForSingleObject(hMutex, INFINITE);
hThread = CreateThread(...);
InitializeThread(hThread);
ReleaseMutex(hMutex);
WaitForSingleObject(hThread...);
```
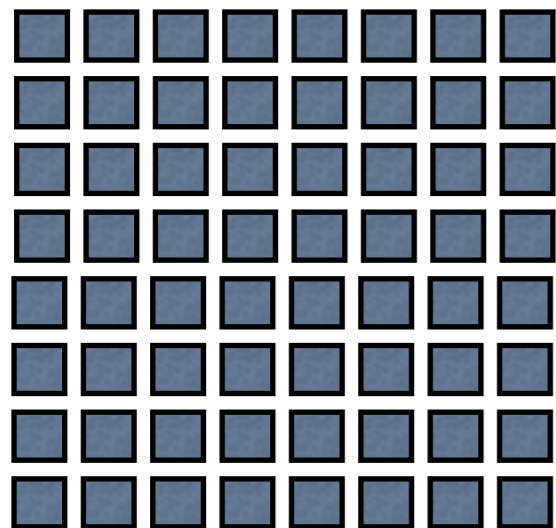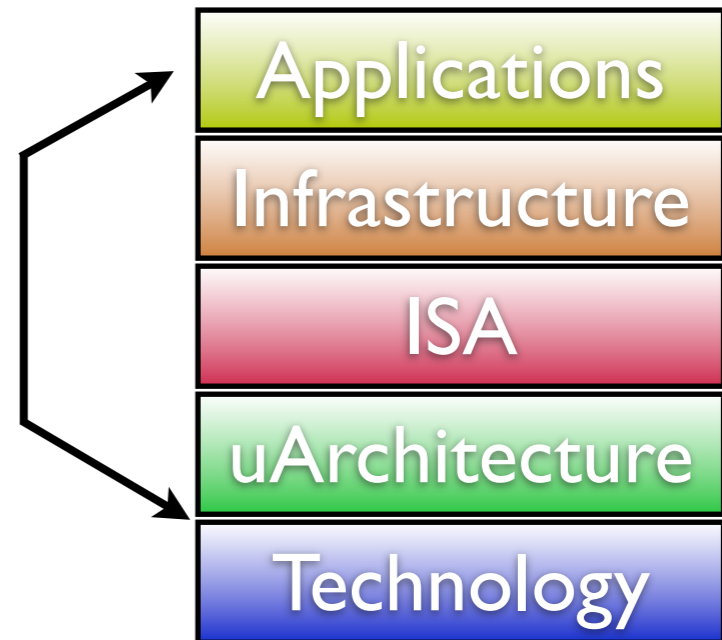
Why is this code "multicore code"?

```
for_all((a,b) in (rows, columns))
    for_reduce(i in rows)
        result[a,b] += A[a,i]*B[i,b]
```
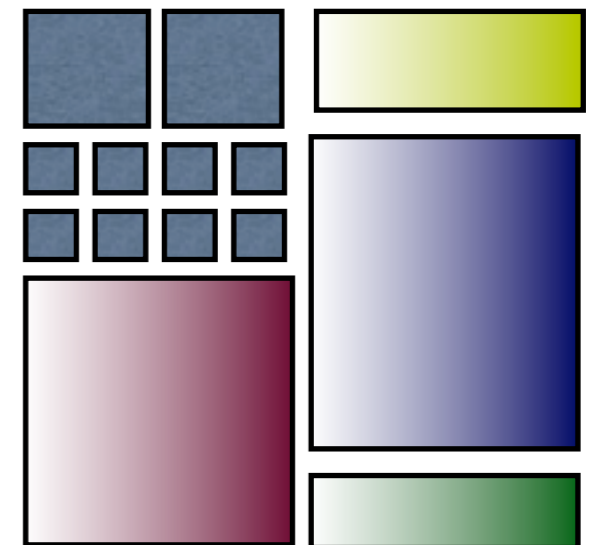
SHOW ME THE MONEY!!!

- Where's the need for implicit communication (shared memory)

- Where's the need for programmer exposed threads?

- Where's the need for the hardware ISA = programmer ISA, even conceptually?

We are going to change everything; this much we agree on.

Applications

Infrastructure

ISA

uArchitecture

Technology

My contention: if we inflict that much change on the industry, then more efficient architectures than manycore are likely out there.

.... but a word of caution:

Let's not smoke too much non-multicore crack either...

dataflow	crack + pipe = token
intelligent memory	where's my crack again?
FPGA computing	cook your own crack
TLS	speculatively smoked crack
...	...

Non-multicore research (ILP research?) is no utopia. It will require just as much, if not more innovation, risk, and effort.

Zen Architecture

Somewhere an idea will blossom...