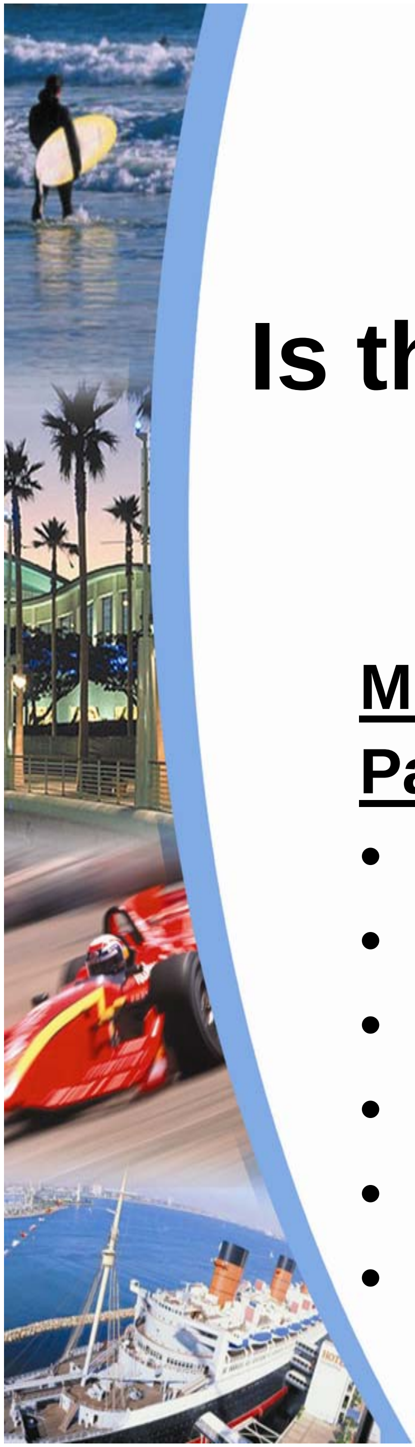


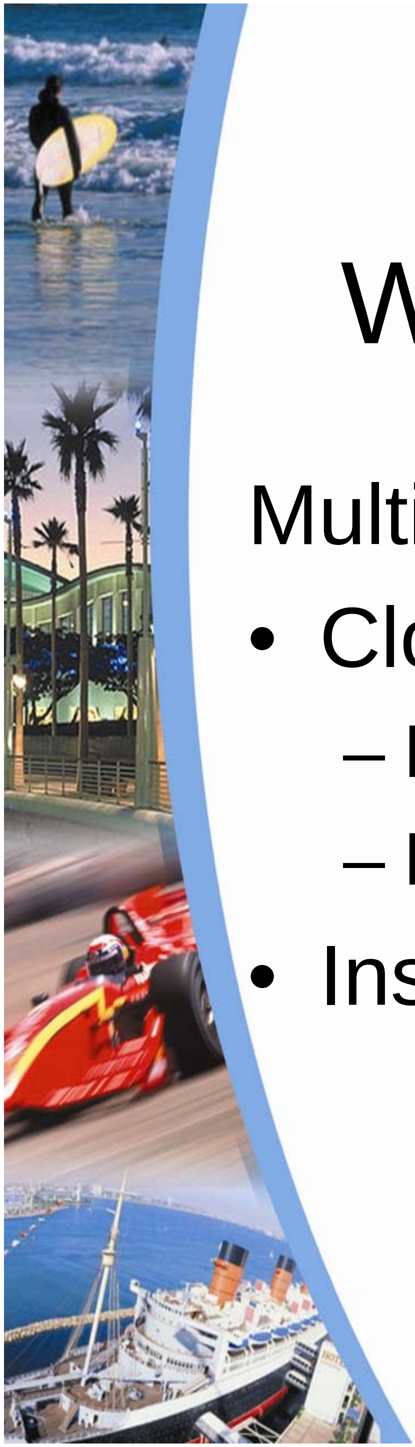
IPDPS 2007 California
International Parallel & Distributed Processing Symposium

Is the Multi-Core Roadmap going to Live Up to its Promises?

Moderator: Per Stenstrom, Chalmers

Panelists:

- Robert Cypher, Sun Microsystems
- Michel Dubois, Univ. of Southern California
- Tim Mattson, Intel
- Kunle Olukotun, Stanford University
- Greg Pfister, IBM
- Dean Tullsen, University of California, San Diego

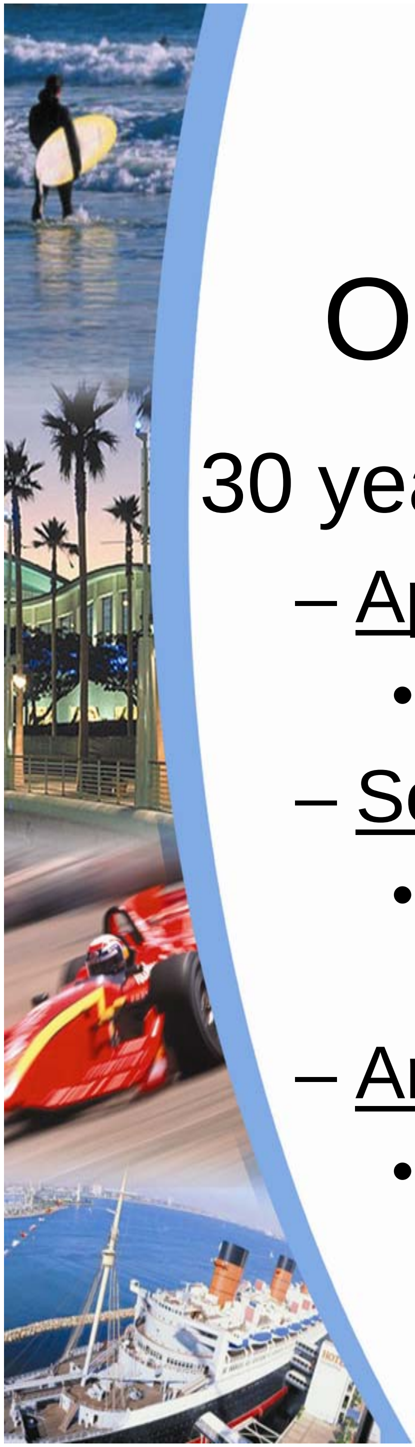


Why multi-cores are here

Multiple upcoming walls, simultaneously

- Clock frequency scaling
  - Power consumption
  - Memory latency
- Instruction-level parallelism drained

=> Multiprocessors (multi-cores)



Old concept in a new setting

30 years of research: What did we learn?

- Applications/Algorithms:
  - Successful in some domains; less so in others
- Software:
  - Progress in some areas (OS) less so in others (compilers + languages)
- Architecture
  - Lots of progress – is it enough?

Questions

Q1: Is today a better setting for multiprocessors, or not?

If yes, in what sense? If not, why?

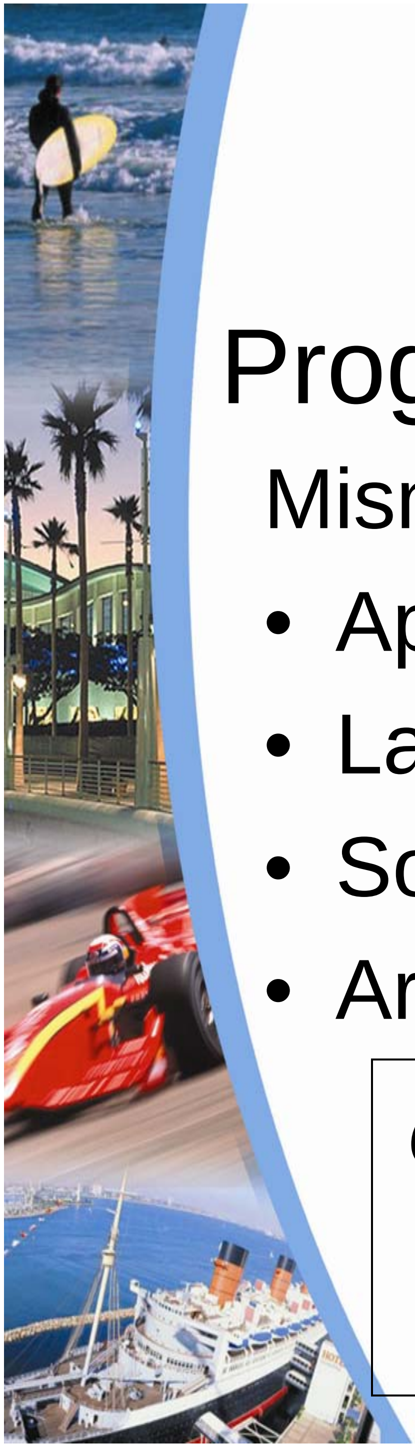
Q2: Do we need more research? Then, what are the challenges?

If not, why?

Multi-cores: A new software crisis

- Most legacy code is single threaded
- Compilers are of little help
- Parallel programming difficult
  - Educational gap
  - Semantic gap
  - Maybe, a mental gap

Q3: Can sequential programming prevail; if not, how do we provide a smooth path?



Progress was needed, yesterday!

Mismatch between all levels

- Applications
- Languages
- Software
- Architecture

Q4: Would more collaboration across disciplines help progress? Then how? If not, why?