Frontiers of Extreme Computing 2007 Zettaflops Workshop

Erik P. DeBenedictis

Sandia National Laboratories

- **Schedule Notice**
  - **9:00 Tony Hey**
  - **9:30 Almadena Chtchelkanova – time switch with ⇩**
  - **10:00 Bob Lucas – time switch with ⇧**
  - **11:30 John Gustafson, Clearspeed – new on agenda**
  - **12:00 Karu Sankaralingam**
  - **1:30 Tom Cwik**
  - **2:00 Gian-Luca Bona**

NOTE: Can we discuss carpooling to the airport tomorrow!

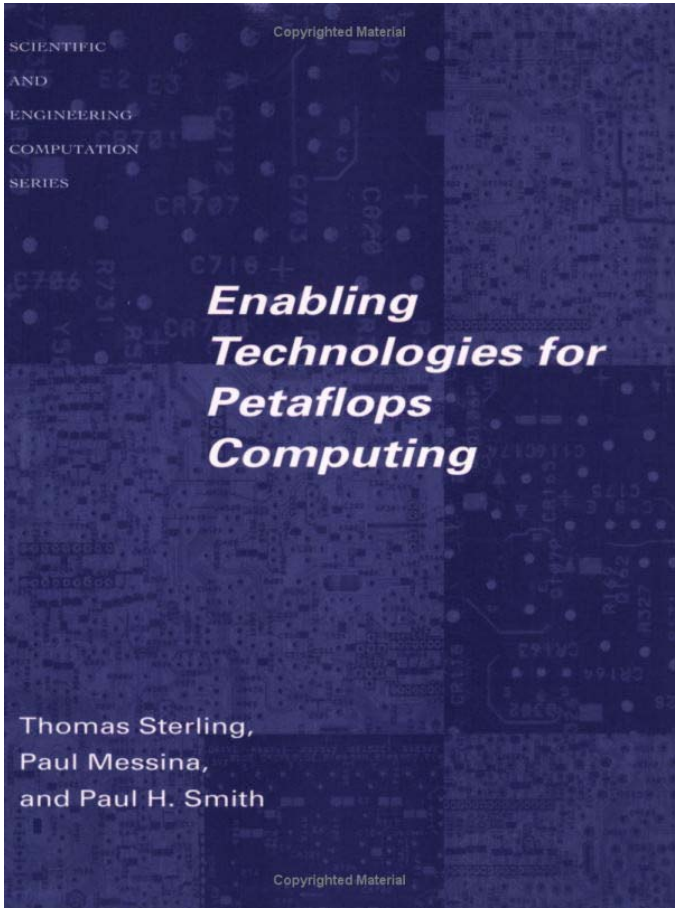
History

Sandia National Laboratories

History and Book

- 1994 Petaflops I, Pasadena
- 1999 Petaflops II, Santa Barbara
- 2002 WIMPS, Bodega Bay
- 2005 Zettaflops, Santa Cruz
- 2007 Zettaflops, Santa Cruz

- [Note: there were other activities]



Sandia National Laboratories

Petaflops/Zettaflops Format

- These are interdisciplinary workshops on computation in the future
  - Technology is best sold for the benefit of its use to society
    - This is an objective of the workshop
  - We assemble people representing the self-organized “technology stack” that benefits society through computation, reinforcing our team

What Can We Accomplish?
(Erik's Suggestion, need your help)

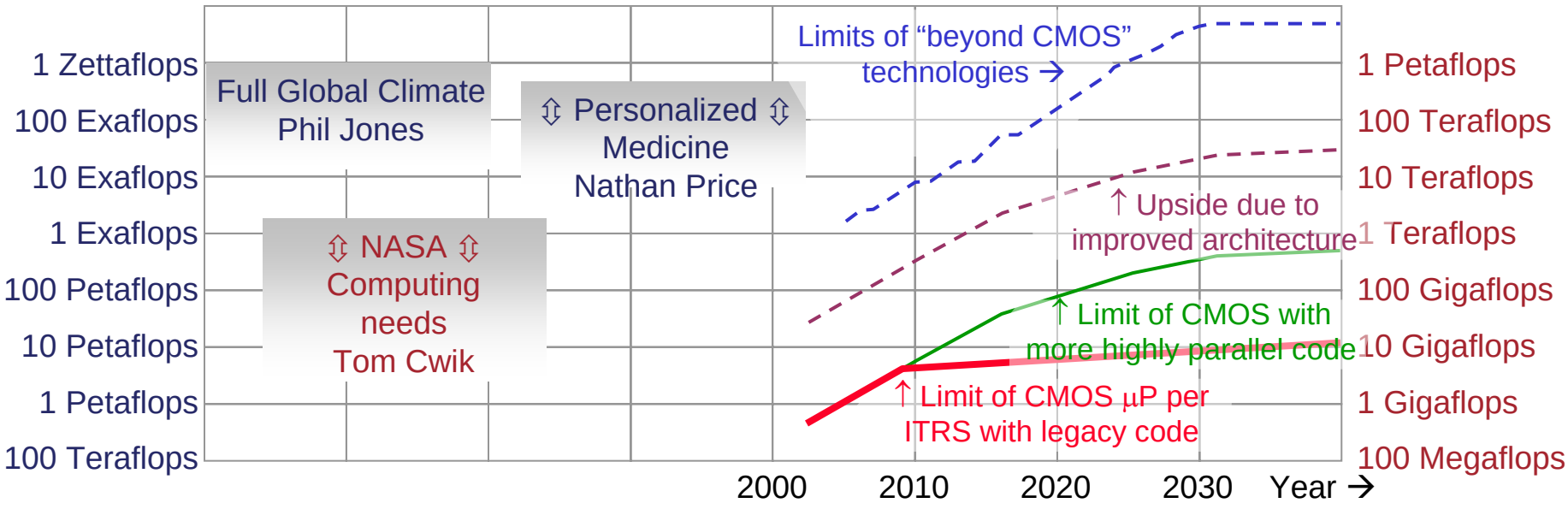
What Can We Accomplish? (Erik's Suggestion, need your help)

- We have a unique group
  - Broader: Devices through applications
- There are several post-petaflops activities approaching Congress
- Zettaflops is not a part of any such initiative, but we are funded by DOE, DARPA, and have participation by several other Government agencies, and industry

- Action: Leverage our unique breadth by thinking through the key, broad cross-cutting issue of the day
- See if we can support one or more of the advanced computing initiatives, increasing the likelihood of their getting funded
- The cross-cutting issue: how much value to society will result from different computational technology investments

Objective of Workshop: Fill In Blanks Here

Supercomputer Performance (5 MW) | Applications | Technology | Mobile Performance (5 W)



Sandia National Laboratories

Delivering Result

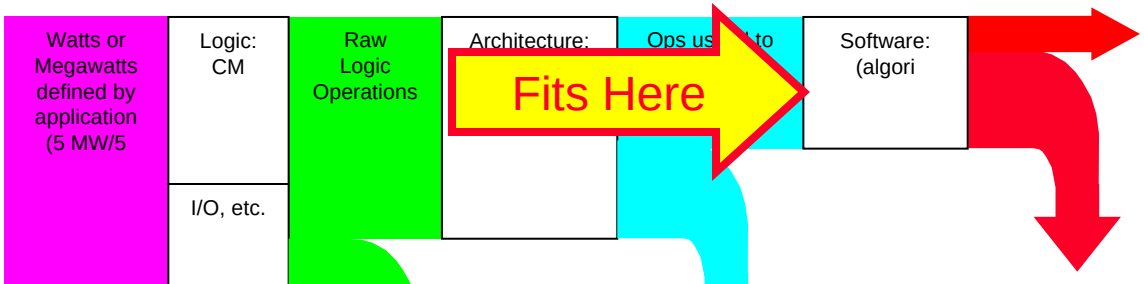
- One result: Thomas Sterling as agreed to write a monograph
- Another result: Talks on Website and personal relationships enabling rhetoric in the future
- Action to Result
  - By Thursday lunch, have collected raw material for above
- Working groups: Participants please come to consensus on what you can agree upon

Wednesday Speakers

Sandia National Laboratories

Tony Hey

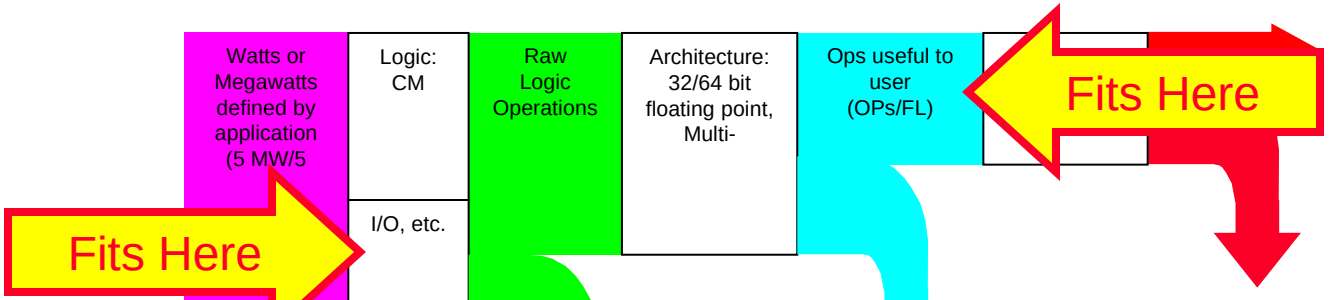
- **Talk Title: *eResearch in the Cloud: Data-Intensive High Performance Computing***
- **Speaker Title: Corporate Vice President for Technical Computing**
- **History: New to Workshop**
- **Upside Potential: Software and tools increase ability to solve important problems**



Sandia National Laboratories

Almadena Chtchelkanova

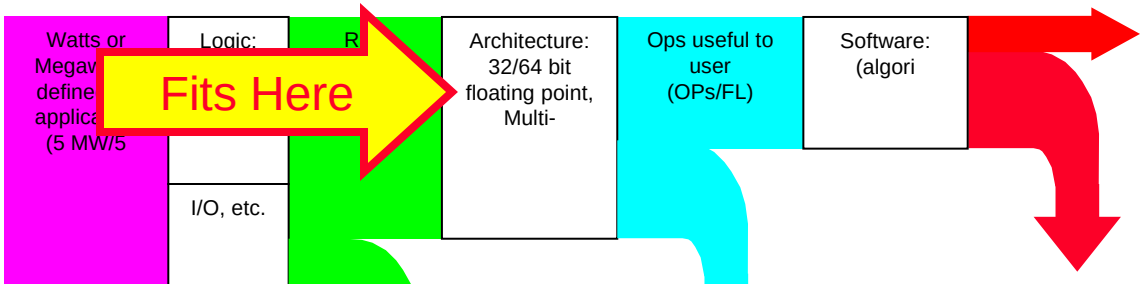
- **Talk Title: *NSF High End Computing Univ. Research Activity Program***
- **Speaker Title: Program Manager**
- **History: New to Workshop**
- **Upside Potential: Research funding for I/O and software is essential to improvements at these stages**



Sandia National Laboratories

Bob Lucas

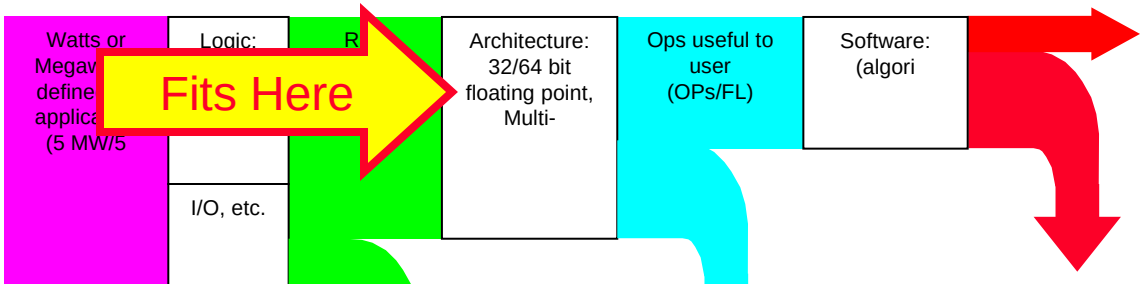
- **Talk Title: *DARPA Exascale Initiative: goals, motivation, range of topics, players, and approach***
- **Speaker Title: "Heading up a new Computational Sciences Division"**
- **History: Participated in 2005 Workshop**
- **Upside Potential: Discussing a Government effort that could lead to R&D funding**



Sandia National Laboratories

John Gustafson

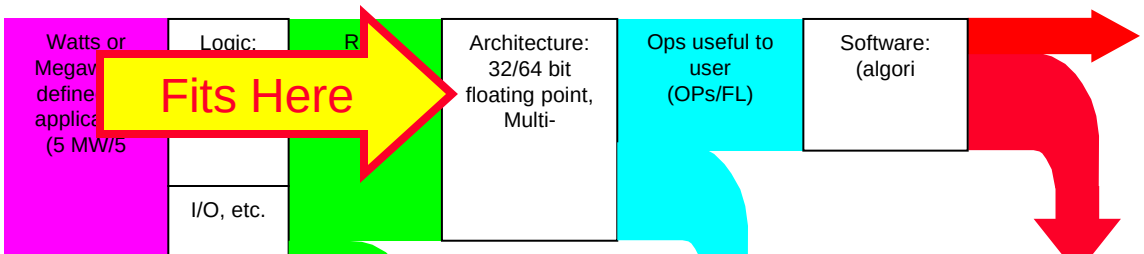
- **Talk Title: *Strategies for solving the heat/power problem***
- **Speaker Title: CTO of HPC, Clearspeed**
- **History: Attended 2005 Workshop**
- **Upside Potential: SIMD is a machine architecture offering an order of magnitude more FLOPS/watt than conventional designs**



Sandia National Laboratories

Karu Sankaralingam

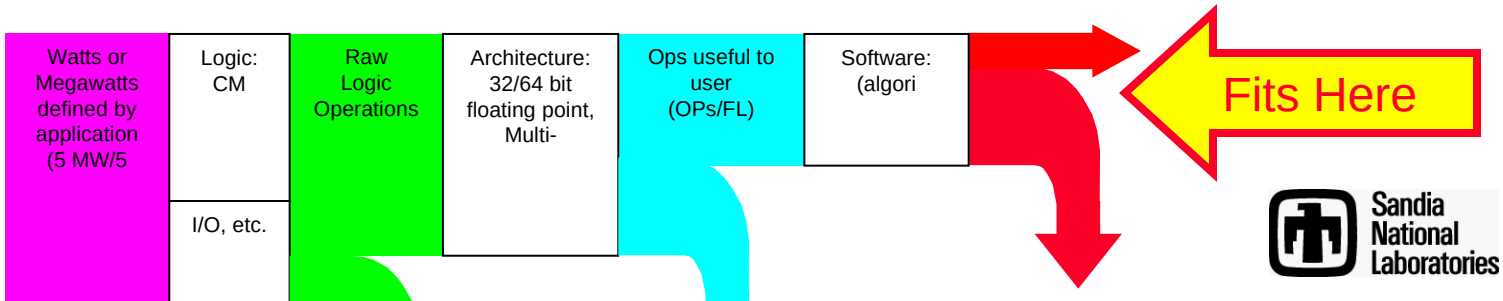
- **Talk Title: *A System Perspective on End of Silicon***
- **Speaker Title: Faculty, U. Wisconsin**
- **History: New to Workshop**
- **Upside Potential: TRIPS is a novel multi-core architecture, which seems dead center on what the technology will support well**



Sandia National Laboratories

Tom Cwik

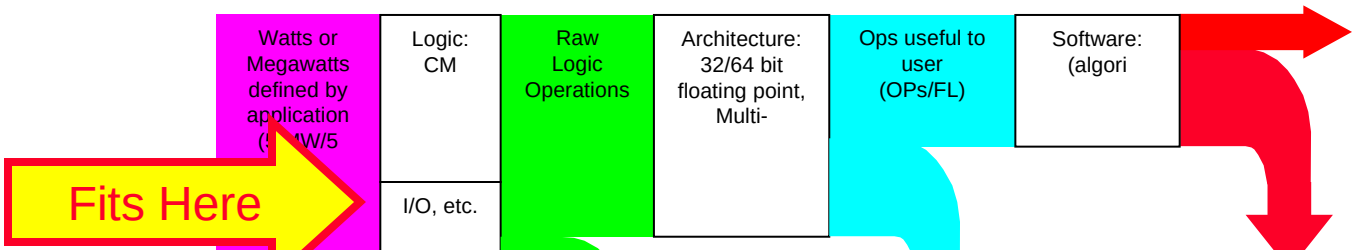
- **Talk Title: *NASA/JPL Future Computing Needs***
- **Speaker Title: [title unknown], JPL**
- **History: New to Workshop**
- **Upside Potential: While NASA/JPL is an HPC user, it also has responsibility for space computing that could become another customer for similar technology**



Sandia National Laboratories

Gian Luca Bona

- **Talk Title: *Prospects for Solid State Data Storage: Beyond Flash Memory and the Hard Disk Drive***
- **Speaker Title: Staff, Manager Photonic Networks Science & Technology**
- **History: New to Workshop**
- **Upside Potential: I/O is a basic resource for powering computation**



Sandia National Laboratories

- **Should Gian-Luca go to arch group?**
- **Tony Hey,**
- **Tom Cwik**