Future of SW Research

Barry Boehm
Doris Carver
Bonnie John
Bill Mark
Benjamin Pierce
Shankar Sastry
Kevin Sullivan

Assumptions

- Current infrastructure is woefully inadequate
  - not reliable, not secure, not available
- 50% of large SW projects fail
- SW applications can't talk to each other
- We have a $1T investment in legacy SW

Objectives

- Enable domain experts to do their work through SW
- Develop architectural foundations for effective COTS industries
- Deliver key conceptual and technological advances to the SW community
- Develop richer ways of recording programmer intentions in machine understandable form
- Understand current SW development
  - as a baseline
  - to hedge our bets

Kinds of SW That Need Special Focus

- Networked embedded
  - How to aggregate into larger applications
- Human-information interaction
- Computer mediated group interaction
- Environments for domain experts
  - teachers
  - engineers
  - financial
  - scientists

Underlying Science

- Physics for SW
  - Models of concurrency
- Economics for SW
  - Quantify the value of flexibility in SW terms
- Behavioral science for SW
  - Apply understanding of human perception and memory to SW design
  - Role allocation between SW and humans

Key Leverage Points

- Change the playing field of SW development
  - Change the meaning of "program"
    - Ptolemy, SimuLink, ...
  - Change the meaning of "programmers"
    - Practitioners
- Deliver the key advances
  - Frameworks
    - exploit lightweight formal methods
    - deliver models of concurrency, fault tolerance, security, usability
  - Processes
    - Value-based design
    - Distributed open source testing
- Change the economics of SW
- Define the underlying HW (not vice versa)