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# Los Alamos Computer Science Institute

## Overview: Priorities and Strategies Workshop 2005

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[http://lacs.rice.edu/meetings/internal/slides\\_feb05/overview.pdf](http://lacs.rice.edu/meetings/internal/slides_feb05/overview.pdf)

# History

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- 1999: Los Alamos Computer Science Institute
  - Weigand vision
    - Enhance CS research at LANL
    - Keep parallel computing expertise focused on ASC problems
  - Preliminary planning (Reynders, Kennedy, et al)
  - Los Alamos, Rice, Illinois, Houston, New Mexico, Tennessee
- 2001: Academic Contract Review
  - Planning for all of LACSI
    - First Priorities and Strategies meeting 2002
- 2004: Full Institute Review
  - Continue Focus on long-term research
    - With relevance to LANL and ASC
  - Revise planning and review cycle

# LACSI Objectives

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- To help build a **presence in computer science** research at LANL that is commensurate with the strength of the physics community at Los Alamos.
- To help LANL achieve a level of **prestige in the computer science community** that is on a par with top computer science departments in the nation
- To pursue computer science research that is focused upon the **long-term goals of the HPC programs** at Los Alamos
- To ensure that there remains a **strong focus on high-performance computing** in the academic computer science community.

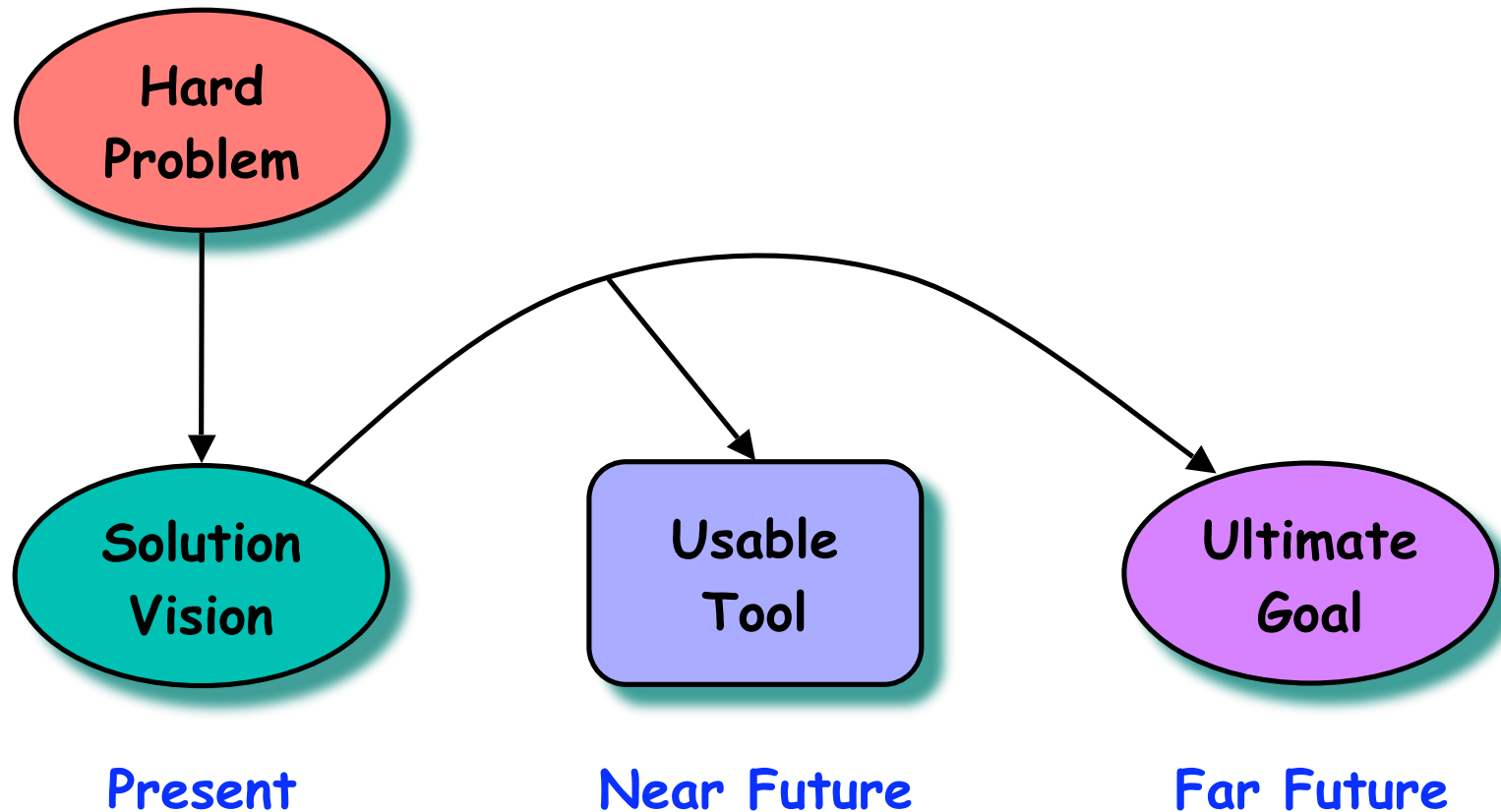
# Research Strategy

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- Focus on Long-Term Investigations
  - Address difficult, long-term problems
  - Select targets based on what will be important in five years
    - Plan and adjust judgments each year
- Drive Research by Problems of Importance to ASC
  - Identify CS challenges from ASC problems
    - CS research should not be simply support for applications
  - Integrate ideas from multiple disciplines
    - Compilers, systems, computational math and applications
- Long-Term Progress for Short-Term Results
  - Harvest results ripe for strategic application areas

# Research Strategy

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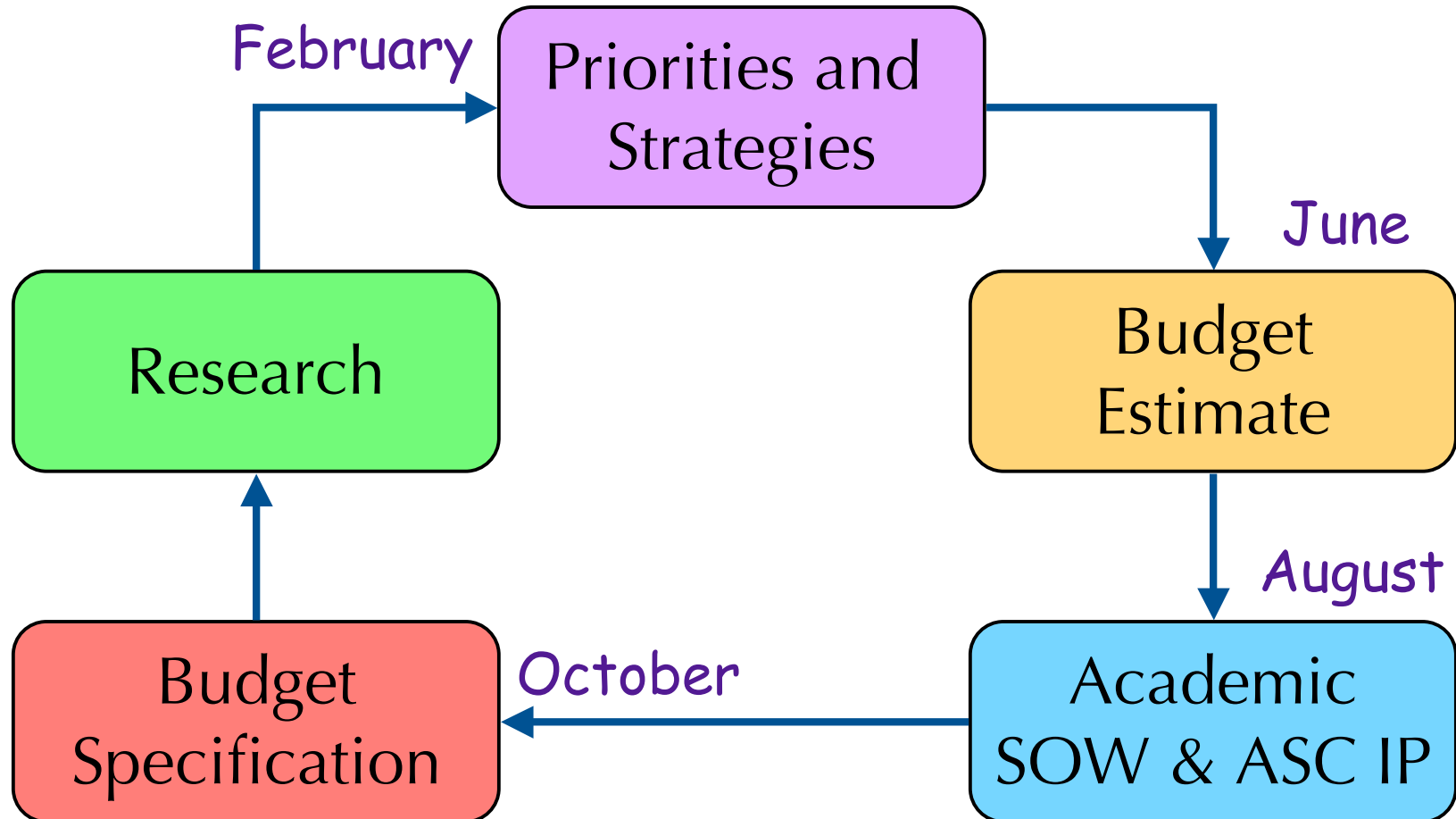
# Sources of Hard Problems

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- Collaborations with Application Developers
  - Performance Workshops
    - Sequence of meetings between tool developers and project teams
    - Tools applied to real code
  - Components Workshops
    - Topic: component-based approaches to code development
- Vision of Senior Researchers
  - Informed by application collaboration and interpretation of ASC priorities
- Strategic Planning
  - Priorities and Strategies Review
    - Plan for all of LACSI (LANL and academic components)
    - Developed at an annual workshop

# Annual Planning Cycle

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# New Planning Process

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- **Annual Review (January-February)**
  - Feedback to ongoing projects
  - Review and approval of proposed projects
- **Priorities and Strategies Workshop (After Review)**
  - Goal: Prepare proposal for the next year of funding
  - Serve as a basis for academic SOW and ASCI IP
- **Proposal Submission and Evaluation (May)**
  - Plan: Submit as a single proposal to Weapons Sponsored Research
  - Approval by procedure yet to be determined
  - Establishment of budget
- **Finalization (August-September)**
  - Final SOW and academic contract



# Proposed Reorganization

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- **Research Organization by Project**
  - Funding horizon 3 years, renewable
  - New project established by proposal
  - Each project should have LANL point of contact
- **Partnership Model**
  - Partners must commit to engaging in LACSI vision-building
  - New partners can be added but must follow model
    - Research participation
    - Leadership contribution
  - Old partners may be phased out
- **Annual Review**
  - Approve new projects and review ongoing ones

# Partnership Model

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- Partnership of six major institutions
  - Partnership means multi-year commitment to the institution
  - Partner responsibility:
    - focus research based on shared vision and plans
  - Ensures attention of important senior researchers on problems of importance to ASC and LANL
- Vision and planning by the Executive Committee
  - Annual review of priorities
    - Plans adjusted based on need
    - Budget adjusted based on need and responsiveness
- Research leaders expected to redirect their research program
  - Multi-year funding critical to focusing effort
  - Example: component integration

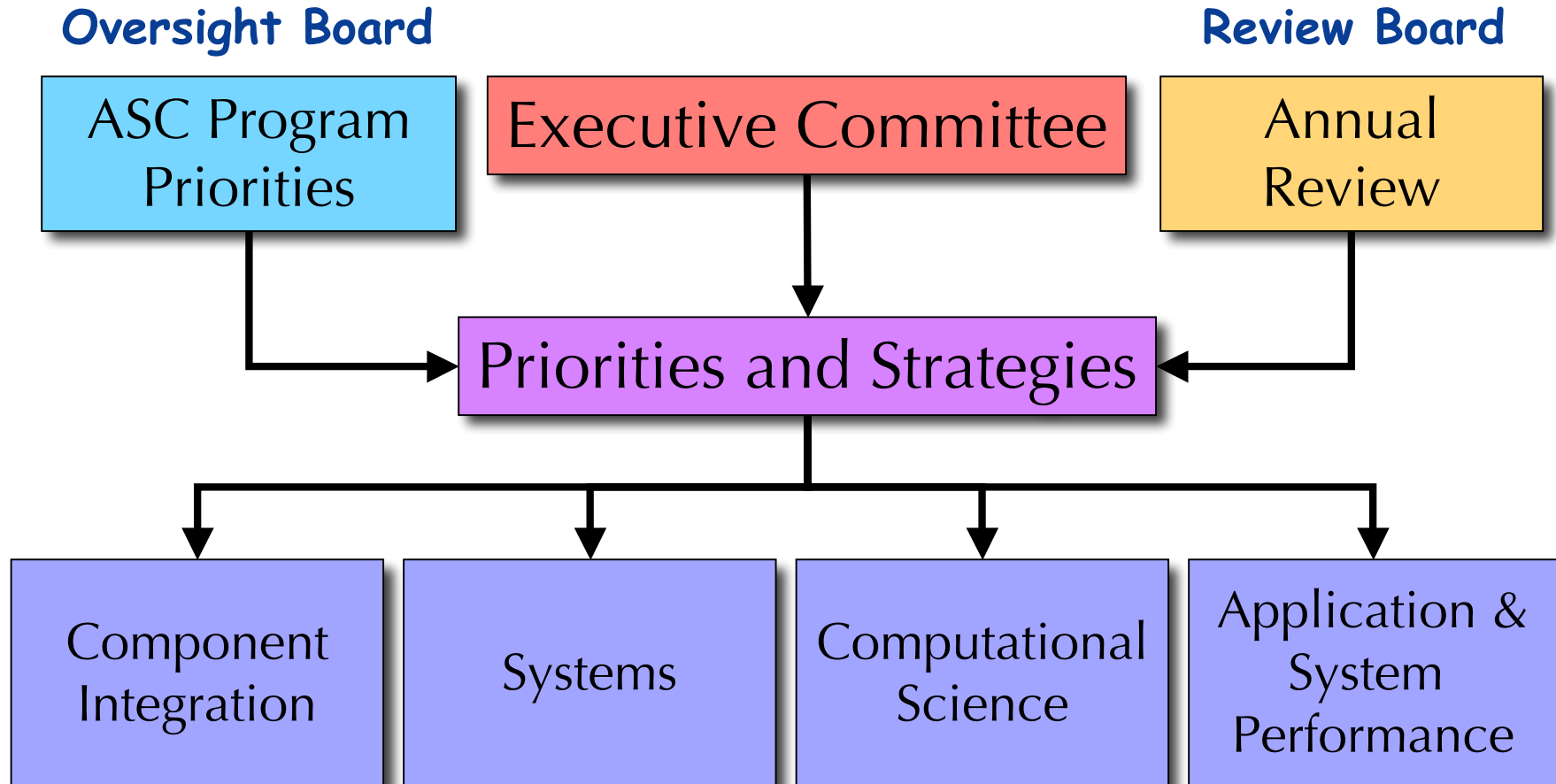
# Proposed Management

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- **LACSI Executive Committee**
  - Responsible for vision-building, proposal preparation, and new project initiation
- **LACSI Oversight Board**
  - Representation of program management
- **LACSI Review Board**
  - Review of ongoing and new activities annually
  - 3-year terms, staggered
  - Mixture of researcher and technology clients

# LACSI Structure and Organization

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# Five Areas

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- **Components**
  - Kennedy and Rasmussen
- **Systems**
  - Oldehoeft and Fowler
- **Foundations of Computational Science**
  - Kothe and Kuznetsov
- **Application (and System) Performance**
  - Hoisie and Mellor-Crummey
- **Community Interaction**
  - Thorpe and Torczon