CCS Division

The Future

August 23, 2000

Safety and Security

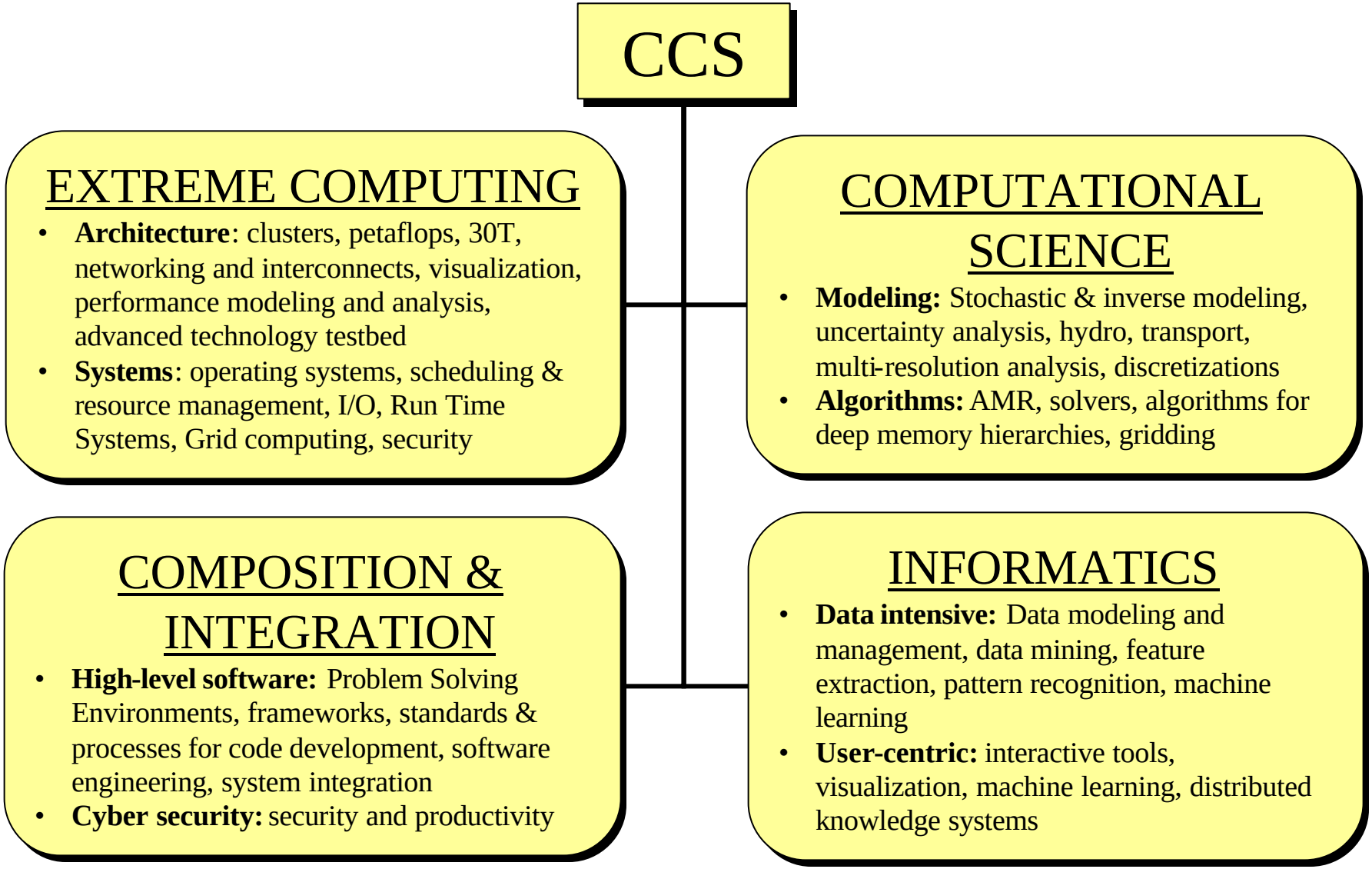
Why have a CCS Division?

- Computer and computational science research is critical for success of Stockpile Stewardship
- CCS Division will focus attention on computer and computational science research, enhancing visibility and sustainability
- Attraction and retention of computer and computational scientist researchers have proven difficult (e.g., a significant fraction of computer and computational scientists has left the Laboratory over the last 6 months: >20% with high potential for more)
- Information technology is increasingly important in all of the Laboratory's activities
- Information technology and bioscience likely will be the most important technologies in the twenty-first century; computer and computational science research is critical

CCS Mission and Goals$_{\text{Interim}}$

- Significantly enhance the Laboratory's capability and credibility in computer and computational science
- Develop and maintain technical excellence and national leadership in computer and computational science research
- Maintain and enhance program and project ties with X, CIC and NW-SC
- Collaboratively develop and enhance program and project ties with B, EES, T, TSA, MST, and other Divisions
- Develop an effective Lab-wide *virtual* CCS Division to raise level of computer science expertise & application Lab wide

CCS Thrust Areas$_{interim}$



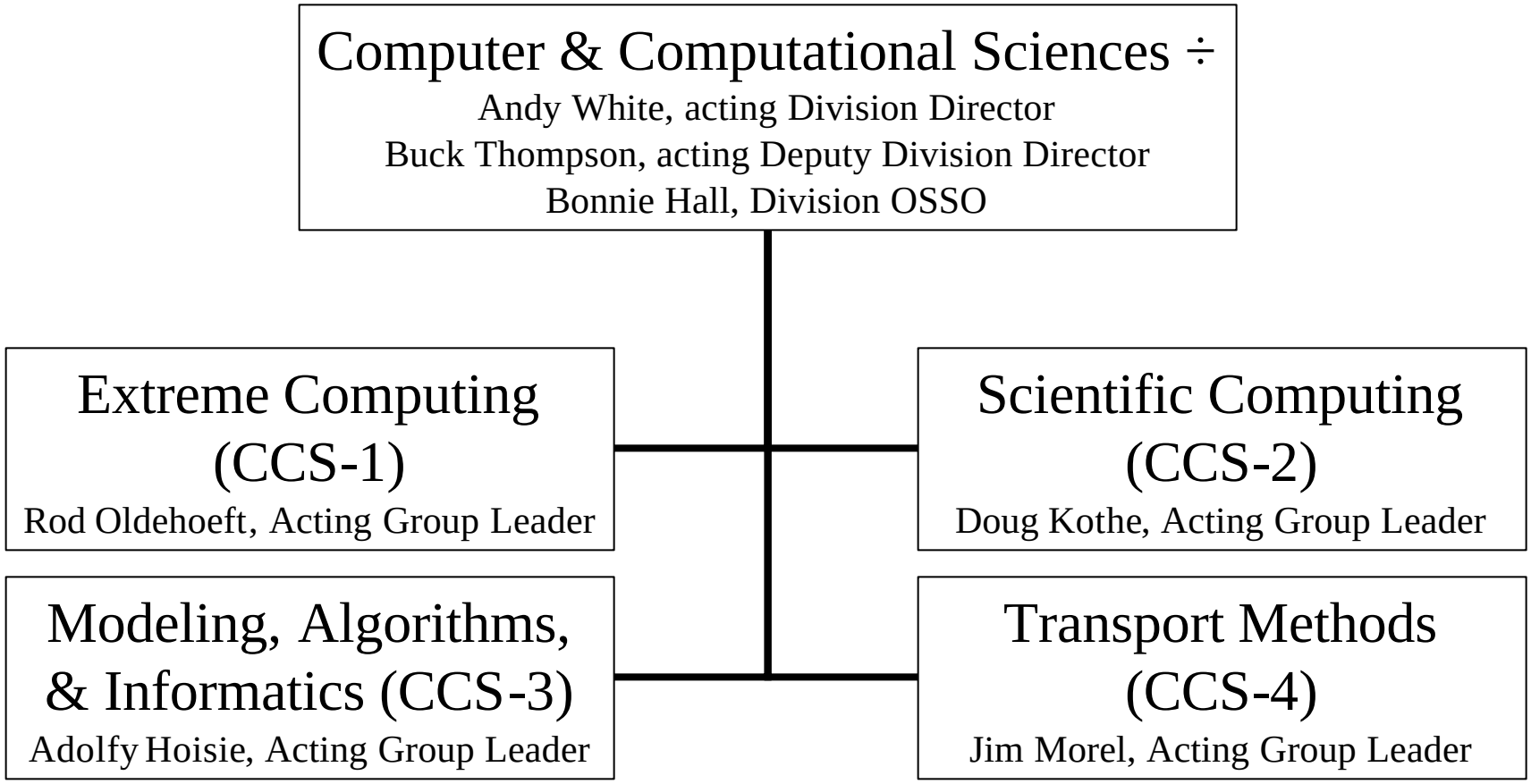
Future Directions, maybe

- Software framework for complex applications
- New algorithms to solve traditional problems defined by dynamics & described by particles and fields
- Petaflops, bio-, molecular, quantum computing
- New methods to solve new problems defined by data & described by graphs and agents
- Uncertainty, verification, validation, trust
- Cyber security: assurance and productivity
- Bioscience, energy and environment, crisis management
- The marketplace and economics

Timeline and Plan

- 6-23-00 to 10-2-00 (***interim)***
  - A 80% correct people solution by 8-23-00 (first CCS Division meeting)
  - LACSI Symposium (August 28, 29), “yall come”
  - Initial structure, funding, functions, space, computing infrastructure issues, and Web site (administrative changes effective 10/2/00)
  - Direct responsibility for safety and security on 10/2/00
- 10-2-00 to 12-31-00
  - Continue to address issues and teams through normal Lab processes
  - As a Division, finalize division structure, functions, mission, goals, vision
  - Better, but not perfect, space
  - Key issues addressed
  - Multi-divisional teams, external collaborations
- by 6-23-02 Engagement of people is critical
  - Inter-galactic search for Division Director concludes
  - Collocation of the Division
  - Two dozen new staff members hired; focus on top external hires

CCS Organization Chart interim



Scientific Computing (CCS-3)

- Doug Kothe, Acting Group Leader (from MST-8)
  - Formerly X-3
    - Ed Caramana
    - Laura Crotzer
    - Larry Dechant
    - Gary Dilts
    - John Grove
    - Giovanni Lapenta
    - Rob Lowrie
    - Vince Mousseau
    - Bill Rider
    - Ray Ristorcelli
    - Mark Taylor
    - John Walter

    16 regular TSM's

    0 admins

    strong interest by 4 others from outside CIC & X

    (CCS-3 represents a little less than half of X-3)
  - Formerly CIC-3, X-6
    - James Quirk
    - Beth Wingate
    - Mike Hall

Transport Methods (CCS-6)

- Jim Morel, Acting Group Leader
  - All members of X-6 except three
  - 22 regular TSM's
  - 1 postdoc
  - 2 students
  - 2 admins

Extreme Computing (CCS-1)

- Rod Oldehoeft, Acting Group Leader
  - All members of the ACL
  - 32 regular TSM's
  - 5 contract personnel
  - 25 students
  - 2 postdocs
  - 2 admins

  - ACL has recently lost over a dozen; strong possibility of others

  - Note: Number of students and postdocs is down by about 25%

Modeling, Algorithms, and Informatics (CCS-2)

- Adolfy Hoisie, Acting Group Leader
  - Almost all members of CIC-3
  - 34 regular TSM's
  - 5 postdocs
  - 25 students
  - 2 admins

  - Note: Number of students and postdocs is down by about 25%

Safety, Security, and Infrastructure

- Safety
  - Assume direct responsibility on 10/2/00; CIC and X remain responsible until then
  - Until 10/2/00, CCS management will work closely with CIC and X to fully learn and appreciate current procedures and practices
- Security
  - Assume direct responsibility on 10/2/00; CIC and X remain responsible until then
  - Until 10/2/00, CCS management will work closely with CIC and X to fully learn and appreciate current procedures and practices
  - OSSO has been designated
- Electronic infrastructure
  - Set up CCS.lanl.gov sub-net for open access
  - Continued access to X Division LAN for secure computing?

Critical Issues for Success

- Staff attraction & retention
  - Working on Computer Science hot skills with CIC, HR
  - Excitement and promise of CCS Division; a new opportunity
- Community access
  - Open computing network for NGI, Rockhopper cluster, & Nirvana Blue
  - Travel and collaboration with foreign nationals
- Long-term CCS Research efforts
  - 50/50 Division goal
  - Reduce administrative burden on staff
  - NW-SC, Office of Science (SC), LDRD
- CCS community in Northern New Mexico
  - Rice University Information Technology Laboratory
  - Info Mesa and other industrial collaborations
- Collaboration and Cooperation
  - Multi-Divisional teams: CIC, X, B, EES, T, TSA, MST, …
  - External enterprises: UNM, UCSD, UCR, Illinois, Rice, Caltech, ...

People, Science, and Success
A Culture for CCS Division

- Mutual support and respect for colleagues
- Cooperation and collaboration
- Excellence and leadership
- No second class citizens
- Shared ownership and responsibility
- Vision, creativity, excitement, and diversity

8U0000 Funding Profile$_{\text{Today}}$

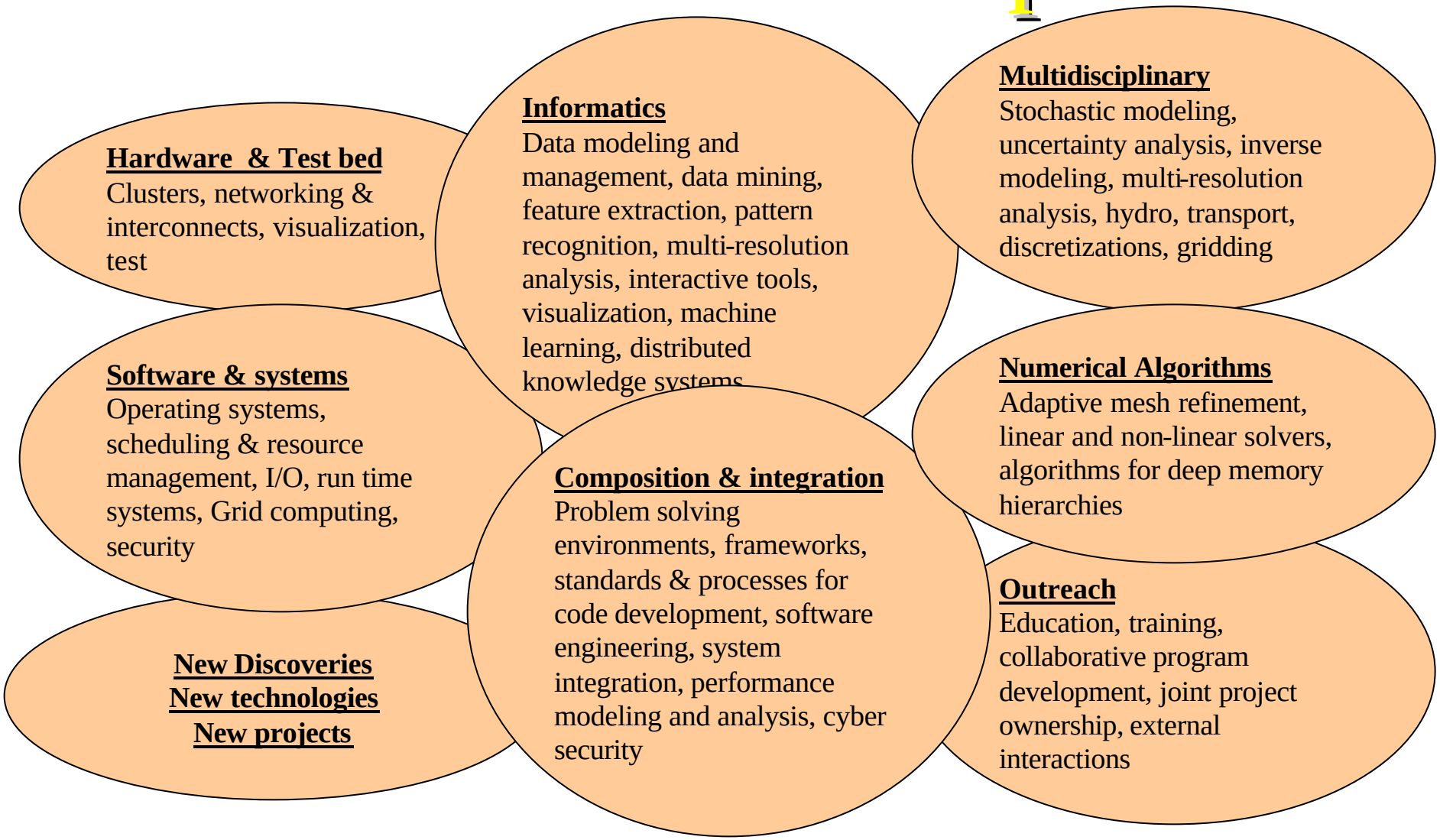
- $20.2M ASCI
- $7.6M Office of Science
- $1.5M LDRD
- $1.1M Weapons (other)
- $0.05M NEST
- $0.3M NIS
- $0.2M G&A
- $0.2M Recharge
- $2.6M Org Support
- TOTALS: $33.1M; 105 TSM's plus admins, students, postdocs, and contract labor

OVER THE NEXT MONTH ...

- A number of others have contacted us from CIC and X groups, plus Divisions outside of CIC and X
- Areas and teams to evaluate: networking, solvers, frameworks, tools, cyber security, …
- Need to take responsibility for safety and security
- Need to work on space issues in order of importance

T-shirt

Functional Description



CIC Will Remain Viable

- Achieved by a close partnership with CCS in which each organization understands and appreciates the other's mission, goals, and needs
- Strength is in excellent people; will work hard to retain and attract
- CIC and CCS will share responsibility for each other's success; the relation must be win-win. Any destructive competition will be stopped.
- CIC will have major and exciting responsibilities: the development and implementation of the HPC infrastructure for the 30T is a prime example
- CIC will also engage in research that will complement the CCS research
- CIC, CCS, and X will make a positive difference together

Survey of Rewarding & Fun Jobs

- Most rewarding: important work, appreciated, time to think and do quality work
- Most fun: Jobs are fun when they have the attributes of a rewarding job
- Worst Job: no sense of importance or appreciation; no time to do quality work

- Most rewarding job and most fun job are almost always the same; worst job is almost always the converse

Why Computer Scientists are Leaving

- Salary
- Too many barriers for external collaborations, particularly with academic colleagues (Foreign National issue, including access to computers and visits)
- Not enough time for research and to do the best job
- Too much time spent on non-productive work (review committees, administrative procedures, proposal writing, etc.)
- Too much short-term programmatic work