LONI Institute: Advancing Biology, Materials, and Computational Science for Research, Education, and Economic Development

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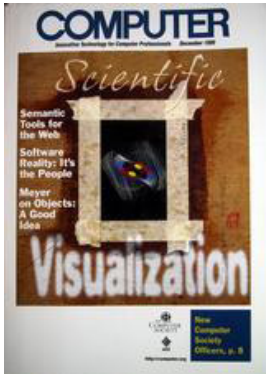
On behalf of LSU, UNO, Tulane, UL-Lafayette, LA Tech, Southern University, LA Community Colleges, LONI

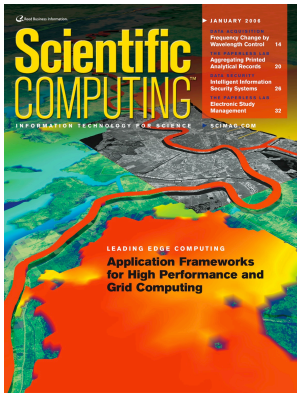
LONI Institute Vision

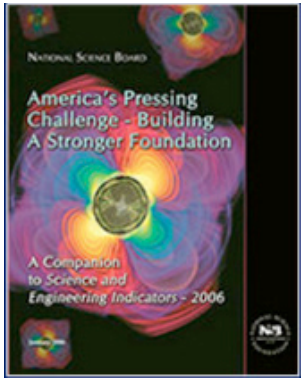
- Build on LONI infrastructure, create *bold new inter-university superstructure*
  - New faculty, staff, students; train others. Focus on ***CS***, ***Bio***, ***Materials***, but *all disciplines impacted*
  - Promote collaborative research at interfaces for innovation
- Draw on, enhance strengths of all universities
  - Strong groups recently created; *collectively world-class*
  - Much stronger recruiting opportunities for all institutions
- Create University-Industry Research Centers (UIRCs)
  - Research Triangle, NCSA/UIUC, Bay Area, others
- Transform our state
  - Such committed cooperation between sites extraordinary

Specific Plans

- Two new faculty at each institution (12 total)
  - Six each in CS, Comp. Bio/Materials with half PKSFI matching; fully covered after five years
- Six Computational Scientists
  - Following Bavarian KONWIHR project
  - Support 70-90 projects over five years; lead to external funding
  - Half for bio/materials; quarter for UIRCs
- Graduate students
  - 36 new students funded, trained; two years each
- One FTE: Coordinator/development professional



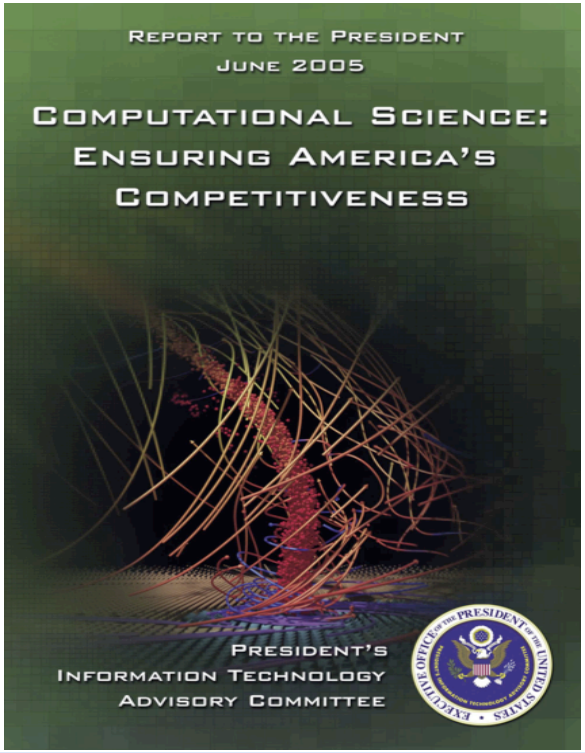


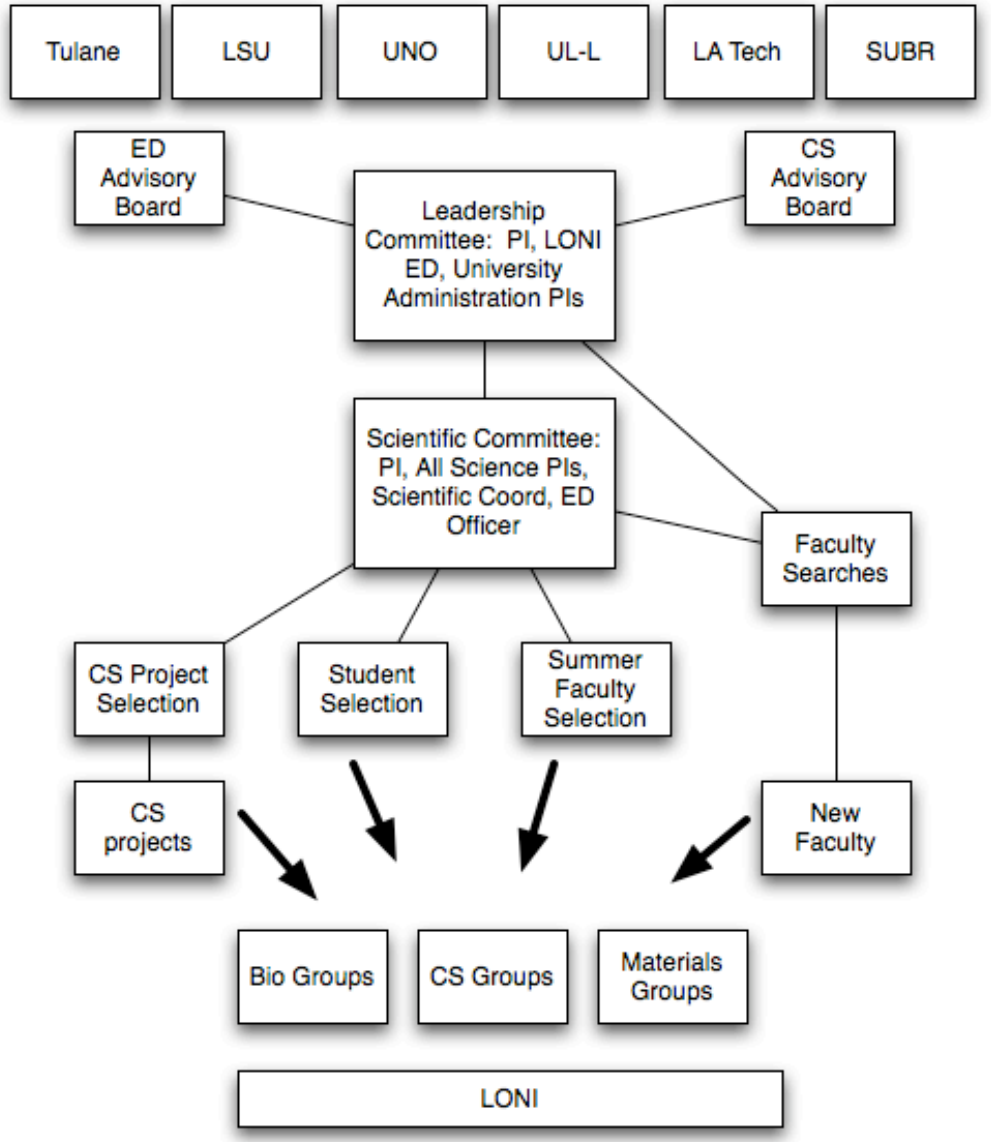


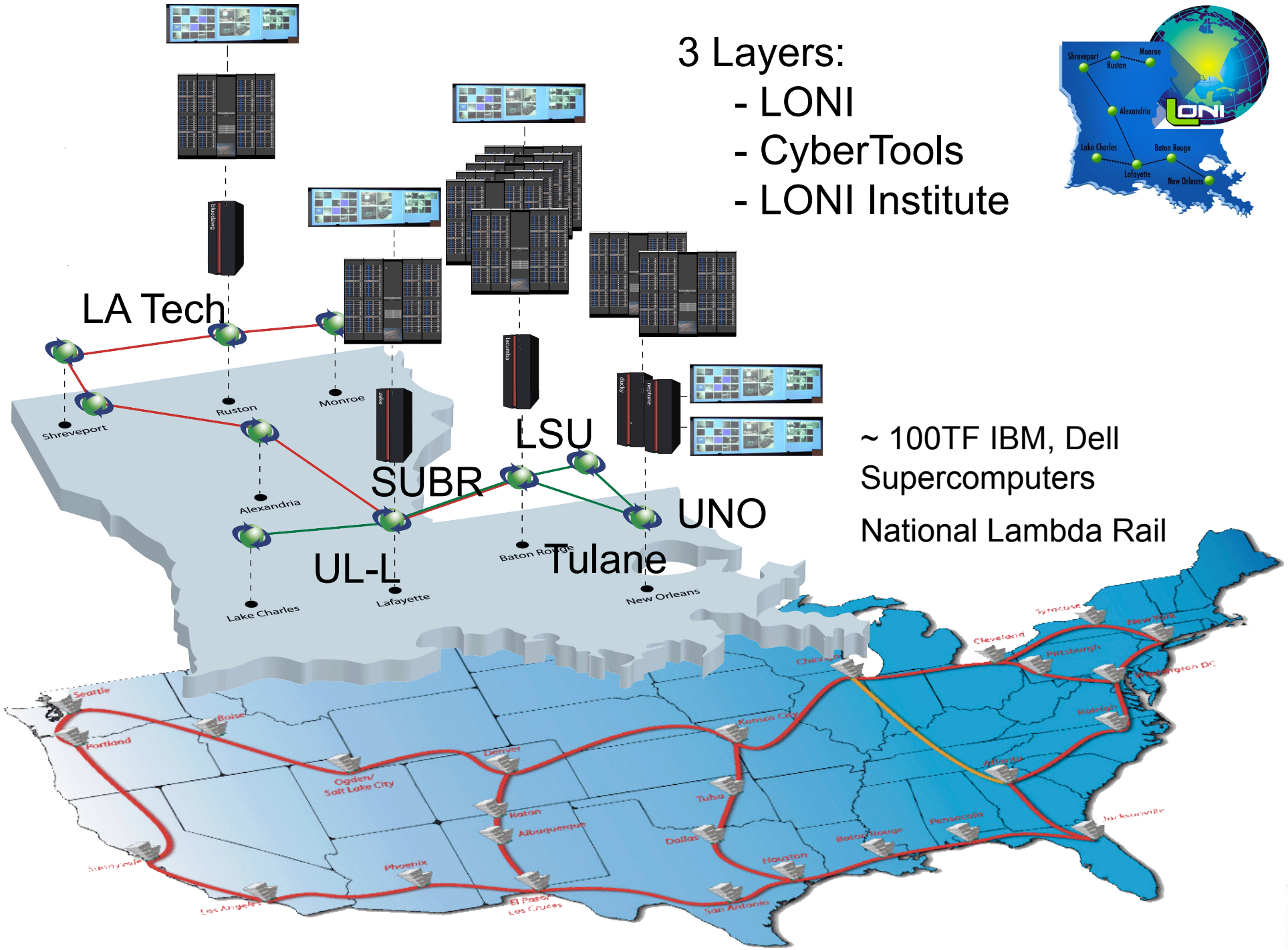
PITAC Report Summary:

LONI Institute Responds

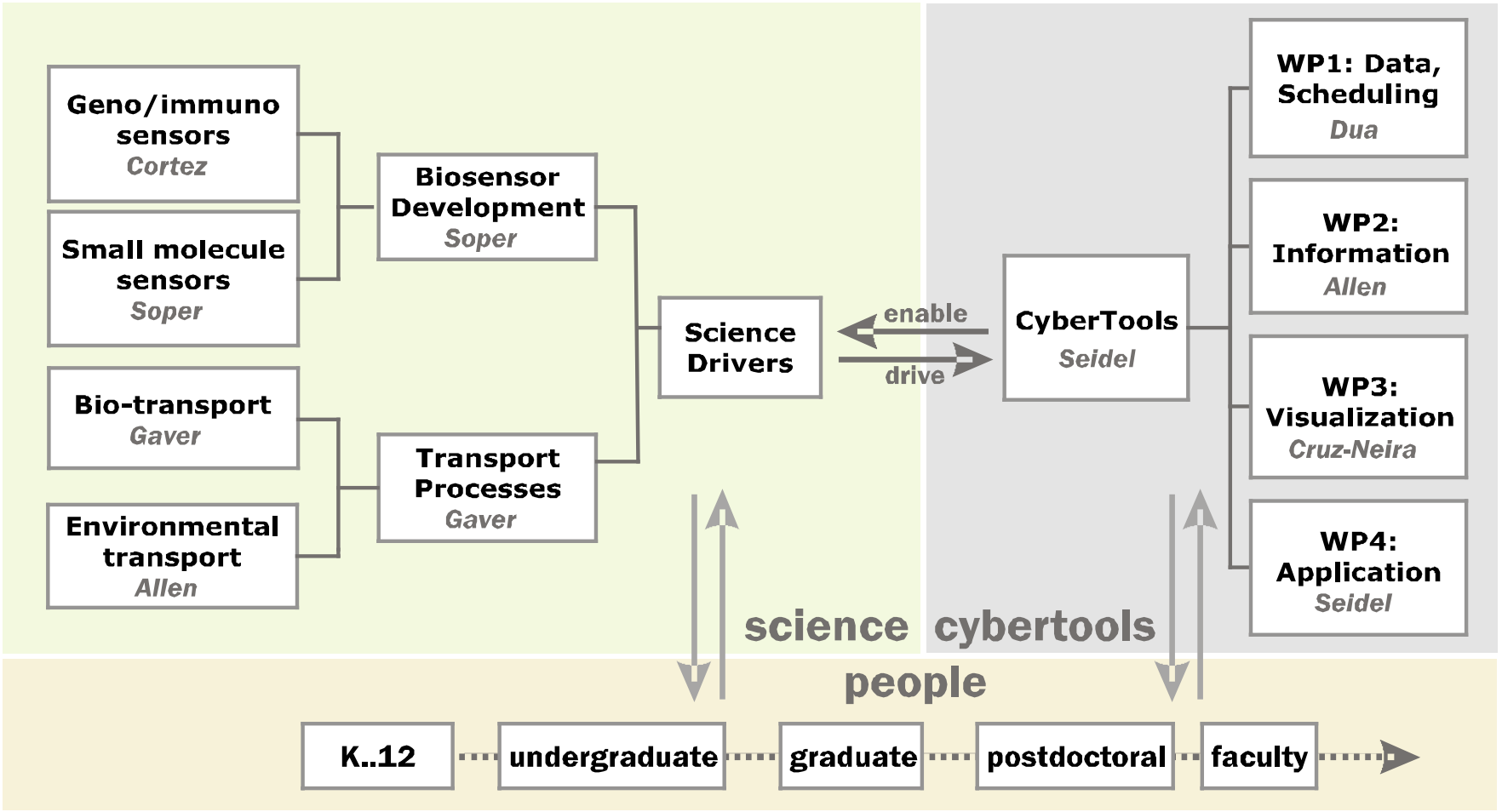
"*Universities must significantly change organizational structures: multidisciplinary & collaborative research are needed [for US] to remain competitive in global science*"






3 Layers:
- LONI
- CyberTools
- LONI Institute
LA Tech
Shreveport
Ruston
Monroe
Alexandria
Lake Charles
Lafayette
Baton Rouge
New Orleans
SUBR
LSU
UNO
Tulane
UL-L
~ 100TF IBM, Dell Supercomputers
National Lambda Rail
Seattle
Portland
Boise
Ogden/ Salt Lake City
Denver
Kansas City
Chicago
Cleveland
Pittsburgh
Syracuse
New York
Washington DC
Raleigh
Atlanta
Jacksonville
Pensacola
Baton Rouge
Houston
Dallas
Tulsa
Raton
Albuquerque
Phoenix
El Paso/ Las Cruces
San Antonio
Los Angeles
Sunnyvale

Cyber Science Structure: Enabler and Driver



CyberTools WPs at a glance

WP1: Scheduling and Data Services

Infrastructure deployment & high availability; scheduling; data archiving & retrieval; metadata

WP2: Information Services and Portals

Information services (infrastructure, apps, experiments); application interfaces for scientists; portals for information gathering

WP3: Visualization Services

Data/Viz integration; HD streaming viz; advanced viz facilities; integration with application toolkits

WP4: Application Toolkits

Development of toolkits to support all simulation codes (CFD, MD, other); app manager; SAGA interfaces

Specific Projects Seed Future

- Leading faculty across state create multi-institutional seed projects
  - PIs, new staff immediately build for future
  - Extraordinary past record of success: hundreds of projects, international impact, now focused on state
- New faculty, staff, students recruited, both from state and to state
- Building on seeds, dozens of new projects selected, started
  - Merit, thematic connection, potential for funding, economic development; proposals evaluated
- Exploit common themes, computing environments, tools found in all areas

Economic Development

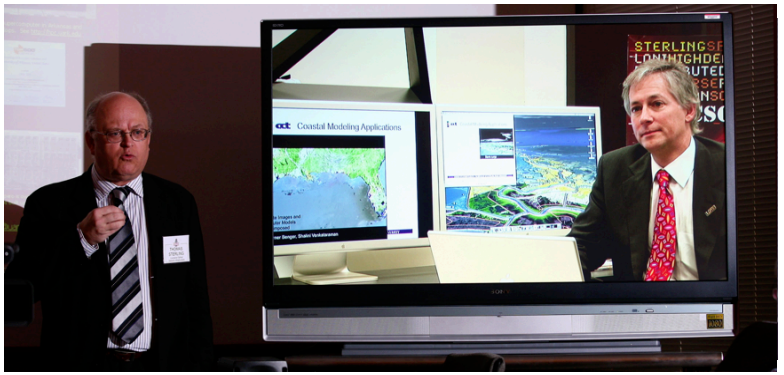
- LI will work closely with university, state, national groups and companies to develop UIRCs
  - Allocate funding for projects specifically with companies
- PIs already working closely with LED on numerous projects
- Council on Competitiveness projects
  - Specific pilot project joining National Innovation Collaboration Initiative with LI and LA Community College System for training
- Partnerships already forming. Examples:
  - Schlumberger, Intel (HPC Business units); Cisco, Microsoft Dow, IBM, Norhrup-Grumman, more (see letters)
  - Cinegrid Digital Media Consortium; film industrv
  - Air Force "Cyberspace Command"

- *Key bottleneck addressed by LI: need more faculty, staff, students active in relevant projects; hundreds trained in many projects; Funding LI will move state past critical point for many discussions*

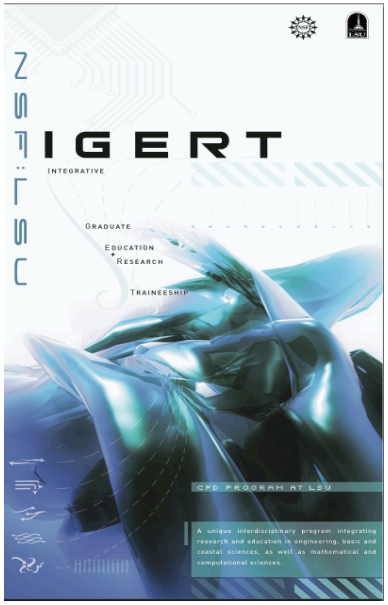
Educating our Future Workforce

"The number of graduates from computational science programs is inadequate to meet even current demand", "New structures, programs, and institutional incentives are urgently required."

- PITAC Report 2005



- Committed to developing coherent computational sciences curriculum across state
  - Dozens of students, over 100 faculty involved in 70-90 new projects
  - New interdisciplinary courses (e.g IGERT)
  - New HD course on HPC; model for state
- *LONI Institute will play a national role in Computing Education*



$3M NSF CFD IGERT

Summary

- Bold new initiative proposed
  - Responds to PITAC, other reports; backed by all research universities, community college system in state
  - Resonates with other proposals: Cybersecurity, AMRI, others
- Responds directly to all six PKSFI solicitation requirements
  - Build on excellence & promote innovative science and tech
    - *Strengths in computation, biology, materials enhanced, combined for innovation at interface between disciplines*
  - Be multi-disciplinary and multi-institutional
    - *All research universities, disciplines connected, served, enhanced*
  - Demonstrate economic development and broad impact
    - *Impacts industry, attracts companies & investments; entire state served*
  - Meaningfully leverage significant existing infrastructure, interest, and commitment
    - *Built directly on top of Vision 2020 and LONI investments*

Budgets

Key Budget Items

- 2 faculty at each site
  - "almost identical"
- 1 computational scientist at each site
  - Identical
- Grad student support at each site
  - Identical
- Coordinator at LSU
- LONI Institute Funds
  - 15K/yr travel, 20K/yr general, 5K in year 1 "printing"

Coordination of Activities

Proposed Management

- Leadership Committee (LC)
  - PI, University Admin PIs, LONI Exec. Dir.
  - Meet in person every 3 months
  - Staffing, strategic directions, inter-institutional alignment
  - Recommendations on planning, resource allocation, economic development
- Scientific Committee (SC)
  - Science/CS PI's + Katz lead scientific agenda
  - Meet in person every 6 months, via video as needed
  - Work with LC on procedures for student, project selection, training, etc
  - Discipline subgroups may be needed, e.g., Digital Arts (Steve Beck), CS (Gabrielle Allen), etc…

Projects, students, etc

- Students: need committee!
  - 2 years each: expect external funding afterwards
  - Basis: excellence and suitability for placement in appropriate groups
- Projects: Committee (led by Dan)
  - Excellence, potential to utilize LONI, involvement in existing LI projects, relevance to corporate partners, likelihood of federal funding, use of national resources, external resources brought to project
  - 25% reserved for industrial partner projects

Advisory Boards

- Meet once per year
  - Computational Science/Bio/Materials/Other Applications
  - Economic Development
  - Possible names:
    - Suzy Tichenor, Mary Wheeler, Jack Dongarra, Larry Smarr, Fran Berman, Rick Stevens, Tom West
    - Ravi Armilli (IBM), Javad Boroumand (Cisco), Clause Baudoin (Schlumberger), Steven Wheat (Intel)
    - Others?
  - Thoughts?

All Hands Meetings

- Create a real LONI community of researchers, staff, students, companies, etc
- 2x per year
  - Projects presented
  - Proposal opportunities suggested
  - Feedback to LONI staff
- Kickoff meeting this fall?

Web Site

- CCT can host it
- Will need help with content
- …