Did You Know?
Gathering Storm

Knowledge Capital – federal government funding of R&D as a fraction of GDP has declined by 60 percent in 40 years.

Human Capital – over two-thirds of the engineers who receive PhDs from United States universities are not United States citizens.

Creativity – United states firms spend over twice as much on litigation as on research. United States K-12 education, which on average is a laggard among industrial economies, costs more per students than any other OECD country.
Our overall public school system—or more accurately 14,000 systems—has shown little sign of improvement, particularly in mathematics and science. Many other nations have been markedly progressing, thereby affecting America’s relative ability to compete effectively for new factories, research laboratories, administrative centers—and jobs.

“The only promising avenue for achieving this latter outcome, in the view of the Gathering Storm committee and many others, is through innovation.”
A Few Factoids

• China is now second in the world in its publication of biomedical research articles, having recently surpassed Japan, the United Kingdom, Germany, Italy, France, Canada and Spain.

• The United States now ranks 22nd among the world’s nations in the density of broadband Internet penetration and 72nd in the density of mobile telephony subscriptions.
• In 2009, 51 percent of *United States* patents were awarded to non-United States companies.

• The World Economic Forum ranks the United States 48th in quality of mathematics and science education.

• Of Wal-Mart’s 6,000 suppliers, 5,000 are in China.

• IBM’s once promising PC business is now owned by a Chinese company.

• The legendary Bell Laboratories is now owned by a French company.
• Hon Hai Precision Industry Co. (computer manufacturing) employs more people than the worldwide employment of Apple, Dell, Microsoft, Intel and Sony combined.

• Only four of the top ten companies receiving United States patents last year were United States companies.

• United States consumers spend significantly more on potato chips than the government devotes to energy R&D.

• In 2000 the number of foreign students studying the physical sciences and engineering in United States graduate schools for the first time surpassed the number of United States students.
• Federal funding of research in the physical sciences as a fraction of GDP fell by 54 percent in the 25 years after 1970. The decline in engineering funding was 51 percent.

• GE has now located the majority of its R&D personnel outside the United States.

• Manufacturing employment in the U.S. computer industry is now lower than when the first personal computer was built in 1975.

• China has now replaced the United States as the world’s number one high-technology exporter.

• Eight of the ten global companies with the largest R&D budgets have established R&D facilities in China, India or both.
• In a survey of global firms planning to build new R&D facilities, 77 percent say they will build in China or India.

• Sixty-nine percent of United States public school students in fifth through eighth grade are taught mathematics by a teacher without a degree or certificate in mathematics.

• Ninety-three percent of United States public school students in fifth through eighth grade are taught the physical sciences by a teacher without a degree or certificate in the physical sciences.

• The United States ranks 27th among developed nations in the proportion of college students receiving undergraduate degrees in science or engineering.
• The United States graduates more visual arts and performing arts majors than engineers.

• The total *annual* federal investment in research in mathematics, the physical sciences and engineering is now equal to the *increase* in United States healthcare costs every nine weeks.

• China’s Tsinghua and Peking Universities are the two largest suppliers of students who receive PhD’s—in the United States.

• All the National Academies Gathering Storm committee’s recommendations could have been fully implemented with the sum America spends on cigarettes each year—with $60 billion left over.
According to the ACT College Readiness report, 78 percent of high school graduates did not meet the readiness benchmark levels for one or more entry-level college courses in mathematics, science, reading and English.
A Regional Solution...

• A regional solution that addresses national problems:
  
  Investment
  Infrastructure
  Education
  Collaboration
  Innovation
Investment: CIC / NCRP Overview

- State and Local Government Initial Investment of $107M
- 501c3 Not-for-Profit Corporation
- 3,500 Acre R&D zoning overlay (Park Controlled)
- Phase 1 - 64 Acre Tract; 135k sq. ft. building
- Hardened and Survivable
  - Anti-terrorist and Force Protection code compliant
  - 40K sq. ft. SAP/SAR classified, high density computing space
  - 4 fiber loops (1 research, 3 commercial)
  - Internal loop configuration
  - Two 2.8 megawatt diesel powered generators – Pad for 3rd Gen, UPS to match
Investment:
NCRP Phases 1-4

1) 1-3 years, 500K sq. ft.

2) 3-7 years, 500K sq. ft.

3) 7-10 years, 600K sq. ft.

4) 10-15 years, 900K sq. ft.
Infrastructure
Education:
Academic Outreach

• Implement a Comprehensive Solution that Ensures Systemic Change
• **Emphasize Professional Development for K-12 Teachers!!!**
• Take Formal & Informal Approaches
• Incorporate Traditional and Non-Traditional Methods
• Focus on the students across elementary/middle (K-8), secondary (9-12) and post-secondary levels.
• Incorporate & Instill 21st Century Skills
• Build Upon Existing STEM related initiatives
• Provide Resources
Approach – 3 Pronged Attack

• **Generate “Buzz”, Create Interest/Awareness**
  - Establish/Build Relationships through…
    • Cyber Day Workshops (K-8)
    • Cyber Awareness Presentations (9-12)
    • Meet/Present to School Boards, Administrators, & Teachers (K-12)

• **Academic Outreach**
  - Establish Cyber Education Network
  - Program Development
    • Host Professional Development Workshops
    • Host Summer Cyber Camps
    • Host Local, Regional, and National Cyber Competitions

• **Workforce Development**
  - Partner with Industry
    • Incorporate industry needs into outreach and development
    • Establish certification programs
  - Partner with Universities
    • Offer new degree programs to meet industry and government needs

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Implement Science, Technology, Engineering & Math initiatives into the classroom. Build a strong foundation in these fields across your student body; serves as a launching platform for a variety of cyber career options.

Cyber Academy

Program provides mechanism to engage students, identify “top talent” and recruit to participate in high-level cyber programs.

CSDC

Specialized Training & Education

4-yr degree program for key cyber talent. Various Cyber Tracts.

Academic Outreach Program

Career Pathways

Academic Pathways

K-12 STEM Initiatives

21st Century Skills

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Host Cyber Camps

- **Cyber Discovery Camp**
  - @ Louisiana Tech University

- **Cyber Forensics Camp**
  - @ Northwestern State University

- **Cyber AVE Camp**
  - @ Louisiana State University Shreveport

- **Cyber Programming Camp**
  - @ University of Louisiana Monroe
Host Cyber Competitions

• **Mini-Urban Challenge**
  – The purpose of this competition is to challenge high school students to design and operate a robotic car built from a LEGO® MINDSTORMS® Education kit that can accurately navigate through a LEGO® city.
  – Bossier City has been named a Regional Host.

• **Northwest Louisiana Autonomous Robotics Competition (NWLA-ARC)**
  – Piloted at Benton Middle School in Bossier Parish, this competition has grown to include schools from across Caddo and Bossier Parishes. The CIC is working with NWLA-ARC to expand the program across the 150 mile region. This competition feeds into the CIC’s regional robotics initiatives.

• **Network Defense Competition**
• **Cyber Patriot II**
• **Cyber Slam**
  – Hosted at Louisiana State University Shreveport, the competition is modeled after FYORG and includes a high intensity animation and visual effects digital media competition.

• **Cyber Storm**
  – hosted at La Tech University. Cyber Storm is a network defense / cyber security competition
Cyber Curricula

- **Cyber Science** – a foundational 18 week long course that will be offered to 9th and 10th graders.

- **Cyber Security** – curriculum will provide students with a basic understanding of computer hardware, software, networks, and encryption.

- **Computer Science** – curriculum will provide students with a basic understanding of computer science, engineering and mathematical concepts. Through an integrated curriculum, students will have a strong foundation from which to further their studies in a growing technology field.

- **Digital Media** - curriculum provides students with a basic understanding of digital media, animation, visual effects, and interactive command and control environments.

- **Digital Forensics** - curriculum provides students with a basic understanding of computer hardware, data storage and collection, networks intrusion, and data degradation.
Academic Pathways

**2 + 2 + 2 Articulation Agreements**

**AVE Articulation**
High School Cyber Courses \(\rightarrow\) BPCC Telecommunications Division \(\rightarrow\) LSUS Fine Arts Department

**Digital Forensics Articulation**
High School Cyber Courses \(\rightarrow\) BPCC CIT Division \(\rightarrow\) NSU Criminal Justice Department

**Cyber Security Articulation**
High School Cyber Courses \(\rightarrow\) BPCC CIT Division \(\rightarrow\) La Tech Cyber Academy

**Computer Science Articulation**
High School Cyber Courses \(\rightarrow\) BPCC CIT Division \(\rightarrow\) La Tech Computer Science Department

During grant period, the RCEC will work to establish articulation agreements with other community and technical colleges in the region.
Moving from a traditional education curriculum to a more project-based, 21st Century curriculum that’s oriented towards innovation.
Workforce Migration