

# ***World Class Math and Science Education for Texas***



**4,000**

Number of Texas math and science teachers  
who left the classroom in 2007

**\$27M**

Amount it cost Texas to replace them



## THE ACADEMY OF MEDICINE, ENGINEERING AND SCIENCE OF TEXAS

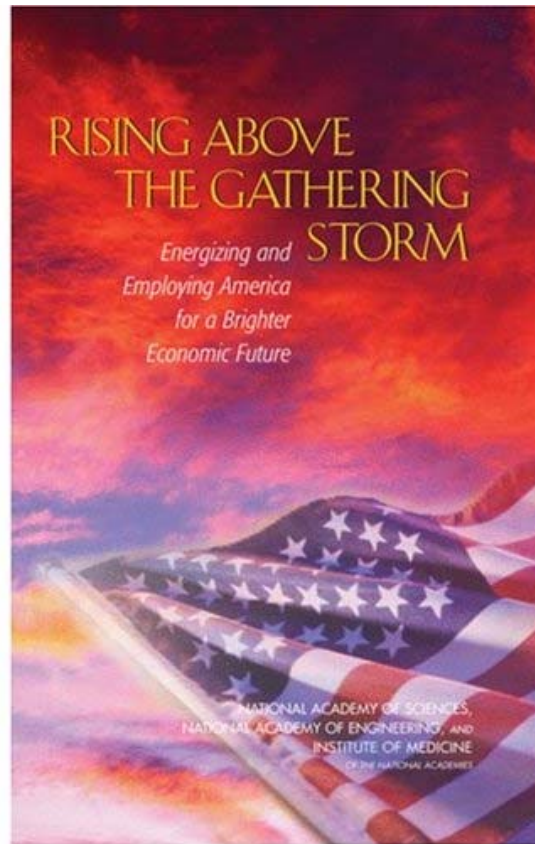
*TAMEST brings together top scientific and technology leaders to share information, expand advanced research and innovation, collaborate on key issues affecting the state, and celebrate outstanding achievement.*

### **TAMEST Membership includes:**

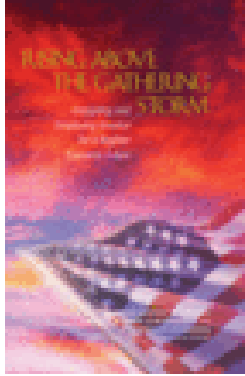
- 10 Texas Nobel Laureates
- 250+ Texas members of National Academies



# Responding to The Gathering Storm in America



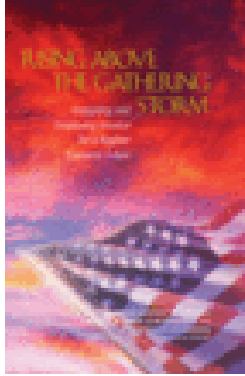
# Frontier exploration



## **2006 National Academies report issued**

*Rising Above the Gathering Storm* makes four recommendations along with 20 implementation actions that federal policy-makers should take to create high-quality jobs and focus new science and technology efforts on meeting the nation's needs.

# Frontier exploration



TAMEST  
Steering  
Committee  
formed

## **Mission of TAMEST Steering Committee:**

Identify challenges & opportunities in Texas' K-12 STEM education, recommend statewide actions

# TAMEST Education Committee

**William R. Brinkley, Ph.D. (Co-Chair)**

Dean, Graduate School of Biomedical Sciences  
Senior Vice President for Graduate Sciences  
*Baylor College of Medicine*

**Mary Ann Rankin, Ph.D. (Co-Chair)**

Dean, College of Natural Sciences  
*The University of Texas at Austin*

**Michael S. Brown, M.D.**

Nobel Laureate  
Regental Professor  
*The University of Texas Southwestern Medical Center*

**Francisco Cigarroa, M.D.**

President  
*The University of Texas Health Science Center at San Antonio*

**Mr. Ernest H. Cockrell**

Chairman  
*Cockrell Interests*

**Russell Hulse, Ph.D.**

Nobel Laureate  
Regental Professor and Associate Vice President for  
Strategic Initiatives  
*The University of Texas at Dallas*

**Neal Lane, Ph.D.**

University Professor  
Senior Fellow: James A. Baker III Institute for Public Policy  
*Rice University*

**Bettie Sue Masters, Ph.D., D.Sc.**

Robert A. Welch Distinguished Professor in Chemistry  
*The University of Texas Health Science Center at San Antonio*

**H. Joseph Newton, Ph.D.**

Dean, College of Science  
*Texas A&M University*

**Mr. Peter O'Donnell, Jr.**

President  
*O'Donnell Foundation*

**Kenneth I. Shine, M.D.**

Executive Vice Chancellor for Health Affairs  
*The University of Texas System*

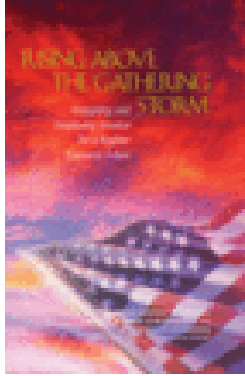
**Mr. Kurt Swogger**

Executive Vice President Investments  
*Planned Innovation<sup>®</sup> Institute*

**Richard Tapia, Ph.D.**

Maxfield-Oshman Professor in Engineering  
Director, Center for Excellence and Equity in Education  
*Rice University*

# Frontier exploration



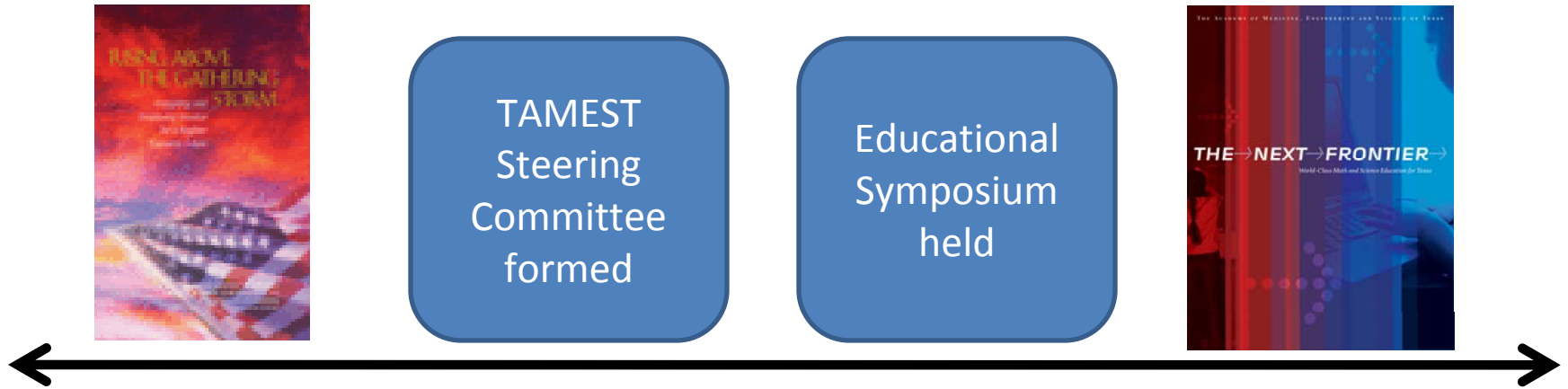
TAMEST  
Steering  
Committee  
formed

Educational  
Symposium  
held

## Education Symposium held in October 2007

Presenters included Texas and national math and science education leaders

# Frontier exploration



## Recommendations identified

Input gathered from 150+ math and science teachers, principals, administrators, policymakers, thought leaders



# **The Next Frontier: World Class Math and Science Education for Texas**

**Four findings and recommendations**

# Recruit, Reward, & Retain Teachers

	Finding	Recommendation
1	Teacher training + support + pay = recruitment & retention	The three R's: recruiting, rewarding and retaining

*In 2005-2006, Texas' average teacher salary ranked **35th nationwide***

## Finding 1:

# Teacher training + support + pay = recruitment and retention

- Teachers make the single greatest difference in academic achievement
- Teacher shortage worsens student performance
- New rigorous standards stretch teaching pool further
- Educated workforce takes passionate, certified, career teachers



# Recommendation 1:

## The three R's:

### Recruiting, Rewarding and Retaining

#### Recruit

- Replicate teacher training programs such as UTeach and MASS

#### Reward

- Increase salaries and stipends for STEM specialists
- Higher pay for STEM specialists at high-need schools
- Financial assistance for teachers to continue their education

#### Retain

- Support new teachers with coaches, weekend workshops & online resources
- Familiarize school leadership with the unique challenges of math and science teaching

# Inspire and Engage Students

	Finding	Recommendation
1	Teacher training + support + pay = recruitment & retention	The three R's: recruiting, rewarding and retaining
2	Interest students in math and science and keep them on the path	Support a variety of ways to keep students engaged in STEM curricula

*In China, **42%** of college undergraduates earn science or engineering degrees; in the U.S, only **5%** of students do so*

## **Finding 2:**

### **Interest students in math and science and keep them on the path**

- Well-designed, effective curricula can inspire students to pursue STEM degrees
- Rigorous standards will improve alignment between K-12 and college
- Instructional strategies vary between districts, classrooms
- Teachers need the right tools to inspire students

## Recommendation 2:

### Support a variety of ways to keep students engaged in STEM curricula

#### Make math & science real for kids

- Support programs featuring hands-on activities and mentoring
- Support programs offering students experience in higher-ed research labs

#### Support a variety of ways to keep students interested in STEM

- Extend involvement in AP Strategies
- Fund elementary-school science labs

#### Help STEM-strong students follow through with successful studies

- Help disadvantaged yet STEM-strong students get into Texas colleges

# Improve College Readiness, Refine Accountability

Finding		Recommendation
1	Teacher training + support + pay = recruitment & retention	The three R's: recruiting, rewarding and retaining
2	Interest students in math and science and keep them on the path	Support a variety of ways to keep students engaged in STEM curricula
3	College readiness is workforce readiness	Match STEM education to higher-ed and industry needs; reward students and schools who meet them

*Of Texas high-school graduates, only **41%** are ready for college-level math (algebra), and only **24%** are ready for college-level science (biology)*

## Finding 3:

### College readiness is workforce readiness

- Texas must create an interconnected K-16 system with common goals and standards
- Refine accountability system is key to improving Texas K-12 education
- A solid STEM foundation will help build success in the global economy

## **Recommendation 3:**

### **Match Education to Higher-Ed and Industry Needs, Reward Students & Schools that Meet Them**

#### **Ensure alignment of STEM concepts**

- Define the STEM concepts, skills, needs of technology students
- Develop aligned classes and teacher certification
- Fund the necessary equipment

#### **Reward high performance and improvement**

- Change accountability measures to reward commended students and school progress

#### **Incorporate more technology, transparency and testing**

- Test grades 3 – 12 students in science annually
- Conduct external curriculum audits in math and science

# Texas STEM Advisory Council

	Finding	Recommendation
1	Teacher training + support + pay = recruitment & retention	The three R's: recruiting, rewarding and retaining
2	Interest students in math and science and keep them on the path	Support a variety of ways to keep students engaged in STEM curricula
3	College readiness is workforce readiness	Match STEM education to higher-ed and industry needs; reward students and schools who meet them
4	Texas must make math and science education a higher priority	Create a Texas STEM Advisory Council



## **Finding 4**

**Texas must make math and science education a higher priority**

# Finding 4:

## Create a Texas STEM Advisory Council

### Council membership

- STEM classroom teachers, school leaders, higher-education representatives, industry leaders and policymakers

### Council responsibilities

- Coordinate stakeholders to identify relevant STEM concepts
- Advise policymakers and education agencies
- Identify proven STEM programs, practices and materials
- Support effective 4x4 courses
- Develop a data-management system to drive improvement

# Student Success = Texas Success

Science and math college graduates will **earn \$1.2 million more** in total salary over their lifetime than those without a college degree

A 25% increase in engineering degrees alone would **add \$6 billion to the Texas economy** in 15 years



# We are at The Next Frontier... what will Texas do?

*"The economic and political events of the past months illustrate the vital need for the US to unleash the talents of all of our citizens if we are to compete in the 21st century.*

*We cannot afford to waste a single mind. Texas must do its part by educating every one of our young people, providing them with the knowledge and skill required to succeed in a technological world."*

*Michael S. Brown, M.D., Nobel Laureate*

*Founding Co-Chair, The Academy of Medicine, Engineering and Science of Texas*



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[www.tamest.org](http://www.tamest.org)

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**Report and related materials embargoed until Tuesday, December 9, 2008**