Challenges/Values/Outcomes

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with

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Wake-up!

Challenges/Values

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Change in the backgrounds and interests of our students
Student motivation

Higher education is now more focused on economic gain for students.

Love of learning has taken a back seat to career success.

(That said, we must foster the appreciation of mathematics.)
The share of 25-year-old Americans with student debt increased to **43 percent** in 2012 from 25 percent in 2003.

As of Quarter 1 of 2012, the **average student loan balance** for all age groups was **$24,301**.

Student debt topped **$1 trillion** in Quarter 3 of 2013, and the share of loans **delinquent 90 days** or more rose to **11.8 percent**.
Constrained Funding

Public colleges and universities have been coping with growing costs and enrollments, along with declining state support. More bureaucracy compounded with more student services. Past tuition increases are not sustainable.
How does mathematics contribute to society?

Mathematical Sciences in 2025.
IMPACT is everywhere

- Physics and Engineering
- Economics and Finance
- Communications/Coding
More Math and Everyday Life

- **Data Sciences**
- Math in the **Biological Sciences**
- Math in **every day life**.
Bottom Line

Our students NEED MATHEMATICS.

Our challenge is to EQUIP them with the math they need.
Adaptable?

Although apparently not said by Charles Darwin,

the following quote is relevant to the mathematical community:

“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change.”
During the past 40 years, we academics have been lulled into a sense of **complacency**. **Teaching loads** for many dropped, **salaries rose**, and **public support** for science seemed assured.
Opportunity for CHANGE!

- Financial pressures on economic model for education.
- Newer learning techniques.
- New technology.
- Exhortations from PCAST.
- Heightened awareness of Math Societies.
- Encouragement of federal agencies and non-profits.
Challenges/Values/Outcomes

Modes of teaching

"Evidence based, interactive, discovery-based learning."

"Competency based programs."

"VAM (Value Added Modeling)."

"Flipping the classroom."

"MOOC’s."

"Hybrid model."
Challenges

A.) Revision of pathways leading to higher retention and completion, especially for underprepared students.

B.) Revisions of curricula, especially in first two years of College mathematics, suitting the changing landscape of mathematics-intensive subjects.

C.) Increased cooperation with other disciplines to better support STEM careers and other careers requiring varying degrees of mathematical understanding and sophistication.

D.) Revisions of teaching methodology leading to more engagement by our students.

E.) Revisions of graduate training in light of changes in the professoriate.
We must raise the level of mathematical understanding and career-appropriate skills throughout the academic landscape.

ONE SIZE DOES NOT FIT ALL!

Nevertheless, this applies to education in K-12, 2-year colleges, 4-year colleges, and universities.

This applies to students entering MATH intensive careers, to all who will become thoughtful members of society.
Values that we **MUST PRESERVE:**

- **Dedication** to the well-being and future of our students.
- **Diversity** in all its forms in our mathematical community.
- **Encouragement** of mathematically **talented** youth.
- **Intellectual** honesty and rigor.
- **Sustenance** of **basic research** in the mathematical sciences.
NEXT STEPS

We should develop

- **Templates** for *Convenings*: institutional, regional, state levels.
- **Case Studies**, highlighting what *WORKS*.
- **Networks** of chairs.
- **Liaison** with NSF, OSTP, state legislatures as well as Sloan, Carnegie and other foundations.
More steps

- New curriculum materials.
- Improved evaluation schemes.
- Data on direct economic benefit of mathematics to society.
- Certificates for excellence.

MAJOR GOAL: Foster local innovation along with develop large scale improvements.
LET’S GET BACK TO WORK!

Thank you all for your interest and involvement.