MATHEMATICAL PREPARATION OF THE FUTURE WORKFORCE
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“Investing in the Next Generation through Innovative and Outstanding Strategies”

(INGenI0uS)
MATHEMATICAL PREPARATION OF THE FUTURE WORKFORCE

- Mathematical sciences are increasingly an integral and essential component of science, technology, economics, social sciences, and national competitiveness.
The way we use math has evolved over the last century.

Math will only continue to grow in importance.

Intensity of math competencies in its purest form over time

- Mathematical Reasoning
- Number Facility
- Mathematics Skill
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- Mathematical scientists, for the most part, remain unaware of the expanding role of mathematics and of the needs in mathematics education, thereby limiting the community’s ability to respond.
Almost 2/3 of all jobs require some average mathematical knowledge, while a mere 2% require no mathematical skills at all.

- Extremely Low: 11%
- Low: 25%
- Average: 63%
- High: 1%
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• Mathematical sciences must attract and produce more broadly trained mathematical sciences majors.
TWO MAJOR STRANDS

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Who do we have in our Classes?

- **College Algebra.** Fewer than 10% intend technical/scientific careers. Fewer than 9% register for Calculus I and fewer than 1% enroll in Calculus III.

- **Calculus I.** Fewer than 10% are in Math or Physical Sciences and only 2% of these are Math.
Figure 1: Distribution of intended careers of all Calculus I students. N = 11,466.
Alternate Pathways

• College Algebra should NOT be a General Education Math course.

• Alternate Mathematics Pathways should be developed for different degree/career goals.

• Alternate degree options should be developed for the mathematics major.
Curriculum and Pedagogy

• Losing students in calculus and STEM majors is a great cost to our nation’s intellectual and scientific well being.

• Survey (Bressoud et al) concludes in Calculus I student confidence dropped effectively -0.46 of a point and enjoyment of mathematics dropped effectively -0.27 of a point on a scale 1-6.

• Largest drops at large research universities; women disproportionately drop STEM; underprepared students more likely to drop.
WORKSHOP OUTCOMES

• Improve public awareness of usefulness of math in STEM AND non STEM careers.
• Engage in preparation of students for nonacademic careers.
• Bridge academia with BIG.
• Develop new curricular pathways and embrace best practice pedagogies.
• Diversify incentives, rewards, and recognition in academia.