

# HUMAN TALENT: BUILDING A 21<sup>st</sup> CENTURY WORKFORCE

Central to America’s ability to maintain its innovation leadership in the 21<sup>st</sup> Century will be a highly skilled, highly educated workforce. Semiconductor companies – and companies from across the high technology and manufacturing sectors – require access to the world’s best scientists, technologists, engineers and mathematicians. Furthermore, all Americans must benefit from a world-class education system so that they may fully participate in both the modern workforce and society at large.

Today, however, the nation faces a troubling workforce trend. If current education and immigration patterns continue, U.S. economic leadership could be significantly weakened. The supply of Americans graduating with degrees in science, technology, engineering and mathematics (STEM) is not meeting the demands of the U.S. economy. While foreign competitors focus their attention on training the innovators of tomorrow, too few American students are choosing technical degrees and careers. Many students are taught science and mathematics by teachers without sufficient training in these disciplines.

Meanwhile, current U.S. immigration policies prevent American companies from recruiting the world’s best innovators – *including many educated at U.S. universities*. Critical positions remain unfilled while qualified candidates return home to compete against us. President Bush recognized the role highly educated foreign nationals play in America’s competitiveness. His proposal, the American Competitiveness Initiative, calls for reforms that will increase access to the world's most talented individuals.

## KEY FACTS

**Foreign nationals represent over half of the Masters degrees and two-thirds of PhDs in electrical engineering awarded by U.S. universities.**

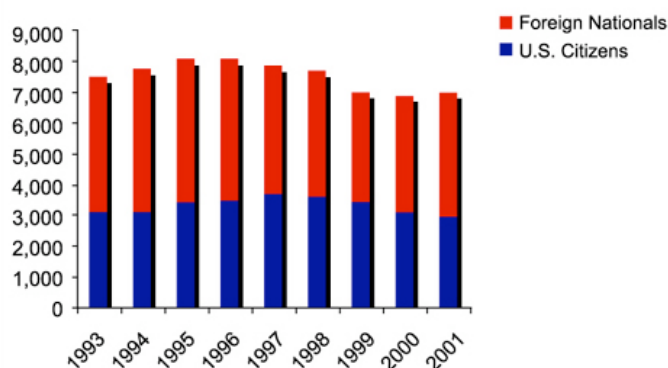
**South Korea, with one-sixth of the U.S. population, graduates the same number of engineers.**

**In 2003, China graduated about 350,000 engineers with four-year degrees, while America graduated about 80,000.**

**U.S. 12th-graders recently performed below the international average for 21 countries on a test of general knowledge in mathematics and science.**

**In 1999, only 41% of U.S. 8th-graders had a math teacher who had majored in math or studied the subject for teacher certification. The international average was 71%.**

**Doctoral Degrees from U.S. Universities in Engineering, Mathematics and Computer Sciences**



SOURCE: National Science Foundation, *Science & Engineering Indicators* - 2004

## WHAT OTHERS SAY:

*(We must) make the United States the most attractive setting in which to study and perform research so that we can develop, recruit, and retain the best and brightest students, scientists, and engineers from within the United States and throughout the world.*

**“The Gathering Storm” Report  
The National Academies**

## **Building a 21<sup>st</sup> Century Workforce – Long-, Mid-, Short-Term Solutions**

Ensuring that America remains competitive requires actions that will bear fruit in twenty years as well as tomorrow. The business community stands ready to do its part, and many SIA members work hard in their communities to strengthen math and science education for American students. However, too few American students are pursuing studies in science, technology, engineering and math fields. This waning interest needs to be addressed at all stages of the pipeline, from K-12 through university and graduate-level. Public policy leadership is required if the United States is to be successful.

- **Long-Term Solutions – K-12 Mathematics and Science Teaching and Attainment**

The first person to walk on Mars is today studying addition and subtraction. Education should nurture children's interest in math and science and expose them to the many opportunities to engage in exciting study and work in these fields. We must upgrade K-12 mathematics and science teaching and improve the proficiency of all students in math and science. The solutions to improve math and science education must address student achievement, have a strong foundation of data and research, and be nationally scalable. The Administration's American Competitiveness Initiative proposals for **MathNow** programs for elementary and middle school and the AP/IB incentive programs for high school will be critical to ensuring students have the fundamental skills in these areas. Additional ways to accomplish this goal include enhancing loan forgiveness programs for professionals with science, technical, engineering and mathematics degrees (STEM) who pursue K-12 teaching careers. Other options would be creating differentiated pay scales for mathematics and science teachers and modifying teaching certification procedures to allow professionals in the STEM fields to easily transition to the K-12 teaching environment.

- **Mid-Term Solutions – Undergraduate and Graduate Incentives for STEM Study**

We must do more to attract and retain students to study and pursue careers in STEM fields. As a first step, we should increase scholarship programs and provide other incentives for students in STEM disciplines. A rich university research environment drives student interest. As a result, boosting and sustaining government funding for basic research, especially in the physical sciences and engineering, will not only improve America's innovation base, but also increase student interest in these fields.

- **Short-Term Solutions – Policies that Welcome the World's Brightest**

The chip industry stands as a compelling example of the need for both long-term workforce enhancement and short-term workforce solutions. Electrical engineers are the lifeblood of the industry. Over half the masters degrees and two-thirds of the PhDs awarded by U.S. universities in electrical engineering are to foreign nationals. Chip companies must have access to this talent. These individuals have the potential to play key roles in creating opportunities for domestic employment. Semiconductor companies hire very few individuals under the H-1B program and almost all become permanent residents. Yet, they are critical to our competitiveness. Our government policies must be changed to enable the United States to attract and retain the most gifted science, technology, math and engineering students from around the world to study for advanced degrees and stay to work in the United States. Students graduating from U.S. universities with STEM degrees should have streamlined access to green cards. In addition, we must embrace policies that recognize this nation's history as a magnet for innovators from around the globe. Talent is worldwide. We must never close our doors to it.

**For more information on the important role semiconductors play  
in American innovation and competitiveness, please visit:**

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

**Or call SIA at 202.573.6612**