

The Multiplier Effect

BY STUART ANDERSON



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New research shows that foreign-born professionals and students are contributing more to the United States than previously thought—their children are rising intellectual superstars—and without them the nation's technological and scientific standing is at risk.

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While the United States benefits from the entry of skilled foreign-born professionals and international students, research shows that the country gains even more from their children. An astounding 60 percent of the top science students in the United States and 65 percent of the top math students are the children of immigrants. In addition, foreign-born high school students make up 50 percent of the 2004 U.S. Math Olympiad's top scorers, 38 percent of the U.S. Physics Team, and 25 percent of the Intel Science Talent Search finalists—the United States' most prestigious awards for young scientists and mathematicians. The National Foundation for American Policy (NFAP), a non-partisan public policy research group, produced these findings after conducting more than 50 interviews and examining the immigration backgrounds of top U.S. high school students.

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espite some attention paid to the achievements of immigrants, no one has documented the contributions made by the children of immigrants to the math and science base of the United States.

Seven of the top 10 award winners at the 2004 Intel Science Talent Search were immigrants or their children. (In 2003, three of the top four awardees were foreign-born.¹) In fact, in the 2004 Intel Science Talent Search, more children (18) have parents who entered the country on H-1B (professional) visas than parents born in the United States (16). To place this finding in perspective, note that new H-1B visa holders each year represent less than 0.04 percent of the U.S. population,² illustrating the substantial gain in human capital that the United States receives from the entry of these individuals and their offspring. At a time when U.S. leadership in science and technology is threatened, these findings provide evidence that maintaining an open policy toward skilled professionals, international students, and legal immigration is vital to U.S. technological and scientific standing in the world.

Concern That the Nation Is Slipping

"The United States has started to lose its worldwide dominance in critical areas of science and innovation," recently reported *The New York Times*. "Foreign advances in basic science often rival or even exceed America's, apparently with little public awareness of the trend or its implications for jobs, industry, national security, or the vigor of the nation's intellectual and cultural life."³ Analysts cite a declining percentage of prizes awarded to U.S. citizens, publications in professional journals, patents, and other indicators of scientific prowess as reason for concern.

In January 2004, the U.S. government's National Science Board warned that, "The United States has always depended on the inventiveness of its people in order to compete in the world marketplace. Now, prepa-

ration of the science and engineering workforce is a vital arena for national competitiveness." While cognizant of national security issues, the National Science Board expressed concern that the percentage of refused visa applications in important human capital categories had increased significantly in the past few years. Denials of high-skilled employment visa applications nearly doubled between 2001 and 2003, rising from 9.6 percent to 17.8 percent. Similar increases in visa denials have been seen among J-1 exchange visitors, and to a lesser extent, F-1 student visas.⁴ One dynamic of the changed environment is that fewer international students apply to U.S. universities in the first place. For the fall 2004 semester, 76 percent of U.S. graduate schools reported declines in applications from Chinese students and 58 percent reported declines from Indian students, according to a survey of 113 graduate schools by the Council of Graduate Schools.⁵

The historic contributions made to the United States by immigrants in key fields is a major reason these trends have raised alarm bells. An underreported phenomenon in the media and history textbooks is how significant a role immigrants have played in U.S. dominance of technological fields. While much recent news coverage has focused on high-skilled foreign-born professionals as a source of competition for native-born computer programmers and systems analysts, little attention has been paid to the enormous contributions—both individually and collectively—foreign-born individuals have played in U.S. world leadership in science and technology. To cite some examples:

While many scientists played a role in developing the atomic bomb, Russian-born George Kistiakowsky, who designed the bomb's plutonium core, and Hungar-

ian-born John von Neumann, who turned mathematical calculations into computer language, receive much of the credit. Moreover, Hans Bethe believed that the development of the modern computer would have been delayed 10 years without John von Neumann.⁶

Examining Nobel Prizes and other awards, a 1997 National Academy of Sciences report concluded, "[I]t is fairly clear that Americans with recent roots are over-represented in any classification of Americans who have brought honor and recognition to the United States."⁷

Today, more than 50 percent of the engineers with Ph.D.s working in the United States are foreign-born, according to the National Science Foundation. In addition, 45 percent of math and computer scientists with Ph.D.s, as well as life scientists and physicists, are foreign-born. Among master's degree recipients working today, 29.4 percent of engineers, 37 percent of math and computer scientists, and 25 percent of physicists are foreign-born.⁸ These data help illuminate the significant role immigrant scientists and engineers play in the United States.

Despite some attention paid to the achievements of immigrants, no one has documented the contributions made by the children of immigrants to the math and science base of the United States. The limitation of available data is a primary reason the contributions of the children of immigrants are rarely examined. "Standard data sources, including most biographical references, rarely report all the information necessary to record the number of immigrants among prizewinners or selected professions. Place of birth (and sometimes citizenship) is usually available, but details about the person's naturalization and the nativity of her or his parents are rarely available," concluded the National Academy of Sciences. "This means that estimates of the numbers of the second generation are almost never available."⁹

This study closes some of the gap in the research literature. To conduct the research, I consulted Web sites and interviewed finalists of the 2004 Intel Science Talent Search, top scorers of the U.S. Math Olympiad, and members of the U.S. Physics Team, as well as their parents, to obtain biographical and immigration information.

Intel Science Talent Search

Previously known as the Westinghouse talent search or the “Junior Nobel Prize,” more than 95 percent of winners of the Intel Science Talent Search (STS) traditionally have pursued science as a career, with 70 percent earning Ph.D.s or M.D.s.¹⁰ More than 1,500 high school seniors entered the contest in 2004 by completing a detailed entry form that includes short essays on the student’s science interests, academic information, and supporting statements from a teacher/adviser and a supervisor of the student’s project. In addition, the student submits a research paper of 20 pages or less that documents his or her findings, including possible laboratory results. The project should display evidence of “research ability, scientific originality, and creative thinking.”¹¹ The top 40 finalists gathered in Washington, D.C., in March 2004 for the last phase of the competition.

After examining the immigration backgrounds of the Intel STS finalists, the most significant finding is that the proportion of student finalists whose parents came to the United States as professionals on H-1B visas is extraordinary, indicating the United States gains more than was previously realized by the entry of skilled professionals. Nearly half—18 of 40—of the finalists at the Intel STS have parents who entered the country on H-1B visas (known as H-1 prior to 1990), which is more than the 16 children whose parents were born in the United States. Given that, in a U.S. population of 293 million, fewer than 100,000 individuals enter the United States each year on H-1B visas, it demonstrates that this visa category serves as a highly efficient means of the United States assimilating many of the world’s future leading scientists.

A typical path for many H-1B visa holders, which is limited to those in specialty occupations who have received the equivalent of a bachelor’s degree or higher, is first to attend a U.S. university. The father of Ryna Karnik came to the United States from India on a student visa to attend the University of Texas at Austin and later obtained an H-1B visa to begin a successful career in high technology. His daughter Ryna, who finished third in the competition, designed a method for reproducing and testing prototypes of semiconductor chips, for which a patent is pending. “Since

many immigrants come here as students, it works as a strong catalyst for their kids to become focused on academics,” she said.

The data bear out Ryna’s observation. Although a child of native-born parents, Herbert Mason Hedberg, finished first in the competition, nearly a quarter (9 of 40) of Intel STS finalists’ parents came to the United States as international students. The parents of Ann Chi came from Taiwan as graduate students at the University at Buffalo, the State University of New York. Ann’s father earned a Ph.D. and received what was then an H-1 visa to teach at Indiana State University, where he remains a professor.¹² Ann’s sophisticated chemistry research earned her eighth place in the competition.

Students from immigrant families seem acutely aware of the opportunity to excel that their parents gave them by immigrating to the United States. Qilei Hang, who lives in Cumberland, Maryland, was born in China. She came here as an 8-year-old when her father pursued a Ph.D. in engineering and later obtained an H-1B visa. She told me, “If I were in China, I’d be preparing for the big exam, the one that decides whether you go into blue collar work or get to go to college. In China, it’s a one-shot deal.” Her work on using mathematical modeling to increase the efficiency of mineral reclamation is used today and has been recognized by the Society for Mining, Metallurgy, and Exploration.¹³

Russian-born Boris Alexeev, whose father arrived on an H-1B visa to teach at the University of Utah, garnered a second-

place finish for mathematical work, the applications of which range from deciphering the genome and DNA to optical character recognition. Boris also was one of the top scorers in the 2004 U.S. Math Olympiad.

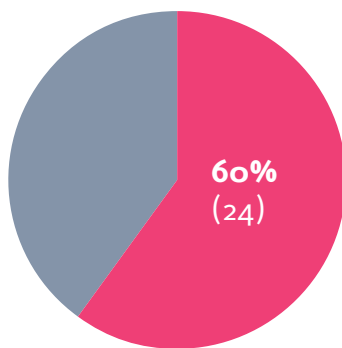
Haim Harel immigrated with his family from Israel on an H-1B visa and has started his third company, Clinton, N.J.-based Magnolia Broadband, which employs 35 people. His son Matan’s physics project involved developing a mathematical model of cell movement. “It’s clear that the scientific future of the United States is reinforced by immigrants,” said Haim Harel. “You see this not only at this contest but at professional conventions and at graduate schools.”

The future scientific and medical accomplishments of the Intel STS finalists are likely to influence many U.S. families. Felicia Yuen-Lee Yen, whose parents originally came as students from China, developed a diagnostic test to help predict tumor formation in the early stages of breast cancer. Felicia, a resident of Dix Hills, New York, said she chose this research and plans to study medicine in college because breast cancer is the second-leading cause of death among women in the United States, killing 40,000 a year. Earlier detection of tumor growth could reduce the death rate from breast cancer significantly.

Melis Nuray Anahtar’s research may help future burn and trauma victims. She designed and built her own microchips to create a device that isolates white blood cells in a way that they can be examined. Since her process takes 10 seconds, rather than the 30 minutes or longer for standard techniques, it could allow diagnostic tests to be performed on unaltered white blood cells. Her father, an architect, entered on an H-1B visa from Turkey and was later sponsored for a green card by his employer.

Indian-born Divya Nettimi, whose father came to the United States with an H-1B visa, will attend Harvard and plans to become a research scientist. Divya, a resident of Oakton, Virginia, has developed theoretical calculations that may enhance the understanding of muscle activity. Her biochemistry project involves “the rate at which myosin, a molecular biomotor, reacts with adenosine triphosphate (ATP), an energy source, and drives muscle contraction.”¹⁴ Neha Chauhan, whose parents also entered from India on H-1B visas, has re-

Table 1 Children of Immigrants Among 2004 Intel Science Talent Search Finalists
Out of 40 High School Seniors



Source: National Foundation for American Policy interviews with finalists and parents.

If those who most oppose immigration had succeeded over the past two decades, two-thirds of the most outstanding future scientists and mathematicians in the United States would not be in the country.

searched food nutrients and compounds that can help prevent Alzheimer's disease. Neha has founded a national organization to increase understanding of Alzheimer's among younger U.S. citizens.

One should not infer from these examples that the United States gains only from the entry of high-skilled professionals and their children. Immigration is the crucial factor in determining whether labor force growth in the United States rises or becomes stagnant as in Western Europe. Parents of 6 of the 40 finalists arrived through the general openness of the United States' immigration system, as opposed to its employment-based part. Three family-sponsored immigrants and two refugees are among the finalists.

The mother of Romanian-born Andrei Munteanu came to the United States after winning the sometimes-criticized Diversity Visa Lottery, which allows individuals from countries with less immigration to the United States to receive up to 50,000 visas a year. Inspired by the movies *Armageddon* and *Sudden Impact*, Andrei has performed research that could contribute to saving us all—literally. He invented a new algorithm to predict collisions between Earth and asteroids. Lisa Doreen Glukhovsky, whose parents came to the United States as refugees from Russia, has developed a “method of measuring near-Earth asteroids [that] could one day help mitigate the danger of asteroid collisions with Earth.”¹⁵ In an extraordinary feat for an amateur astronomer, she used high-resolution asteroid images at both a European and a U.S. observatory to develop a new approach to measuring the distances of asteroids. Like many of the Intel STS finalists, Lisa is fluent in multiple languages (English, French, Russian, and Hebrew) and plays classical music (piano and violin).

Both Daniel Chimin Choi and Duy Minh Ha are in the United States because of family-sponsored immigration. Choi, whose South Korean-born parents were sponsored by a sibling, plans to pursue a Ph.D. in biomedical engineering. He constructed a fuel cell “that derives electricity from bacterial respiration,” which improved generation by 750 percent compared with similar fuel cells.¹⁶ Duy Minh Ha was born in Vietnam and came to the United States after relatives sponsored his family. Duy wants to dedicate his life to studying neurodegenerative disorders. His research on the impact of long-term estrogen replacement therapy on white and gray brain matter may provide clues for lowering the risk of Alzheimer's disease.

U.S. Math Olympiad

The U.S. Math Olympiad, the nation's premiere mathematics competition for high school students, is also dominated by immigrants and the children of immigrants. Organized by the Mathematical Association of America, each year an original group of more than 250,000 students is reduced to (a qualifying round) of 10,000. From there, tests reduce the group to 250, and finally to the top 24 scorers.

From these top scorers, six are chosen to represent the United States at the International Mathematical Olympiad. The book *Count Down* by Steve Olson details the second-place finish (tied with Russia) of the 2001 U.S. team. Four of the six team members that year were the children of immigrants: Tiankai Liu (born in China), Ian Le (born in Australia to Vietnamese refugee parents), David Shin (born in South Korea), and Oaz Nir (born in the United States to Israeli parents who immigrated to Louisiana). The past representation of the children of immigrants in these competi-

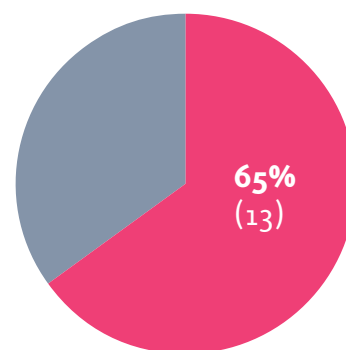
tions illustrate that the findings for 2004 in math and science are not an anomaly but part of a well-established pattern.¹⁷

Immigrants have played an important role in fostering competitive mathematics in the United States. Hungarian-born mathematician George Berzsenyi is credited by many with building the math competition culture in this country, according to Steven Dunbar, director of the American Mathematics Competitions in Lincoln, Nebraska. Romanian immigrant Titu Andreescu, chair of the American Mathematics Competitions, served as head coach of the U.S. Math Team from 1996 until recently. When he traveled with the team, observers dubbed him the “Bela Karoly” of U.S. math, a reference to the Romanian-born coach of the U.S. Olympic champion women's gymnastic team.¹⁸

Among the top scorers of the 2004 U.S. Math Olympiad, 65 percent (13 of 20) were the children of immigrants. A remarkable 50 percent were born outside of the United States (10 of 20). Both proportions are higher than among the finalists of the Intel STS.¹⁹

The immigration background of the parents of the 2004 U.S. Math Olympiad top scorers is similar to that of the Intel STS finalists. More of the Math Olympiad top scorers have parents who received H-1B visas (10) than parents born in the United States (7). Twenty percent (4) of the parents entered first as international students. Two of the 20—Tony Zhang, born in China, and Jongmin Baek, born in South Korea—came to the United States when their U.S.-based

Table 2 **Children of Immigrants Among 2004 U.S. Math Olympiad Top Scorers**
Out of 20 High School Students



Source: National Foundation for American Policy interviews with finalists and parents.

relatives sponsored their parents for immigration. Oleg Golberg arrived with his family as a refugee from Russia.

Interviews with the parents and students reveal a strong family culture of encouragement at an early age. In a number of cases, one finds a parents' professional experience in mathematics, and, in several instances, a student's interest in music. Math and music are similar, according to Jae Bae, who was born in South Korea and lives today in Hackensack, New Jersey. Jae used to play the piano and believes that a good head for math and music go together.

The presence of many immigrant children in the U.S. Math Olympiad is so notable it is even a source of humor among native-born U.S. parents. "My son is the Jewish Caucasian representative," jokes Elizabeth Batson, the mother of Joshua Batson who was an honorable mention top scorer in the 2004 U.S. Math Olympiad. She credits immigrant parents for much of their children's success. "There's a different attitude and different priorities about how kids spend their time."

"Most Asian American children don't see themselves growing up to be NBA players, captains of industry, or politicians.... But many believe that if they do well in mathematics and science, they can succeed. They can become scientists, engineers, computer programmers, physicians," writes *Count Down* author Steve Olson. "All new immigrants to the United States must work hard to succeed, and they expect their children to work hard, too."²⁰

Olson argues that immigrant success in the U.S. Math Olympiad is not coincidental. In addition to the drive of the individuals and their families, he points out that because the students or their parents are recent immigrants, "they speak more than one language and have experience with multiple cultures, which, as [Dean Keith] Simonton demonstrated, can be a source of creativity." Olson adds, "From an early age they absorb the lesson that they must work hard to do well in the United States and that, if they master mathematics and science, they are more likely to succeed. Given the precarious position of immigrant families in U.S. society, the intensity of their drive to succeed is hardly surprising."²¹

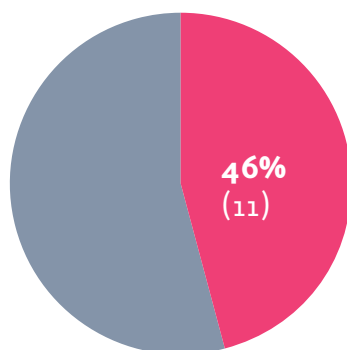
U.S. Physics Team

Nearly half the members of the U.S. Physics Team are the children of immigrants—11 of 24, or 46 percent. In addition, 9 of 24 (or 38 percent) were born outside the United States, primarily from China.

The annual competition organized by the American Association of Physics Teachers and the American Institute of Physics begins each year with high school physics teachers nominating outstanding students. Then, after tabulating the scores of a series of challenging exams, the field is winnowed from 1,100 to 24. These 24 young people make up the U.S. Physics Team. After another week of exams, lab experiments, and classroom work, five students were selected to represent the United States in South Korea at the 2004 International Physics Olympiad.

Two of the five students chosen to represent the United States this year are immigrants. Elena Udovina, the only woman among the five, was born in Russia. Her father, Alexander Bogorad, came to the United States six years ago on an H-1B visa to work in the computer industry. Alexander points to one explanation for the strong showing of students with recent immigrant roots. Based on Elena's experience, he estimates that what U.S. students are taught in twelfth grade math classes, Russian children study in the eighth and ninth grade. "I don't like saying this but math and physics are not the strong side of American schools," said Alexander. He believes U.S. schools need to be more challenging and intensive in math and science fields, and at an earlier age.

Table 3 **Children of Immigrants
On 2004 U.S. Physics Team**
Out of 24 High School Students



Source: National Foundation for American Policy interviews with finalists and parents.

This may be difficult to accomplish in the near future. In 2003, only 26 percent of U.S. high school graduates achieved the benchmark level on the ACT test in science, a level considered necessary to have a reasonable chance of completing first-year college science courses. Fewer than half the graduates even took three years of science classes in high school, including physics, notes the National Science Teachers Association. Previous assessments have concluded that, "on average, only one in five American high school seniors has a solid grasp of science." The association believes recent emphasis on math and reading testing could leave science out of the education reform agenda.²²

Yi Sun, only a sophomore at the Harker School in San Jose, California, and the youngest of the five team representatives, was born in China. His parents, both chemists, first went to Canada and then came to the United States when his father became a postdoctoral fellow at Duke University. Yi sees a strong connection between math and physics, having started in math competitions in the seventh grade. Yi and Elena both were among the top scorers in the 2004 U.S. Math Olympiad.

Mix of Countries

Nearly all of the immigrant parents of U.S. Physics Team members were born in China. The parents of Elena Udovina, born in Russia, are an exception. The foreign-born parents of the 2004 U.S. Math Olympiad's top scorers were divided among South Korea (four), China (four), Russia (three), and India (two). The Intel STS finalists showed a more diverse mix of foreign-born parents, including seven from India, five from China, three from Taiwan, two each from Russia and Ukraine, and one each from Vietnam, Israel, Turkey, and South Korea.

Policy to the Rescue?

If those who most oppose immigration had succeeded over the past two decades, two-thirds of the most outstanding future scientists and mathematicians in the United States would not be in the country since U.S. policy never would have allowed in their parents. Any effort to preserve U.S. strength in science and technology should start by recognizing the key role that immi-

The question is whether the United States will maintain a student and immigration system that is open enough to integrate that talent into U.S. society—or will policymakers push or keep that talent out of the United States?

grants and their children play in the nation's leadership in these fields. As the research detailed here demonstrates, the contributions made by the children of immigrants are beyond that ever considered by policymakers.

Some observers have noted the problem of placing excessive constraints on the entry of individuals who would come to work and study in the United States. "A minor exodus also hit one of the hidden strengths of American science: vast ranks of bright foreigners. In a significant shift of demographics, they began to leave in what experts call a reverse brain drain. After peaking in the mid-1990s, the number of doctoral students from China, India, and Taiwan with plans to stay in the United States began to fall by the hundreds," reported *The New York Times*. "These declines are important, analysts say, because new scientific knowledge is an engine of the American economy and technical innovation, its influence evident in everything from potent drugs to fast computer chips."²³

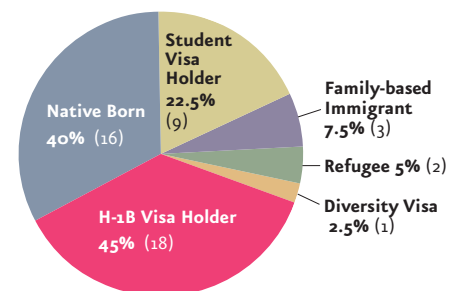
However, the National Science Board, noting the future need for scientists, math-

ematicians, and engineers to keep the United States' competitive edge, has declared, "Even if action is taken today to change these trends, the reversal is 10 to 20 years away." This is not necessarily the case. With a relatively open immigration policy, the future will not be bleak in this area. When immigrants are allowed to come to the United States legally and stay, the nation also in many cases gains the future skills of outstanding children who become U.S. citizens. The question is whether the United States will maintain a student and immigration system that is open enough to integrate that talent into U.S. society—or will policymakers push or keep that talent out of the United States?

Other trends are within the control of U.S. policymakers. For example, for the fourth time in the last decade, the annual cap of 65,000 on H-1B visas has been reached early in the fiscal year, meaning that for several months U.S. employers cannot hire skilled foreign-born professionals on new visas. While in previous years Congress eventually increased the limits, to date there has been no legislative action on increasing

Table 5 Immigration History of Parents of 2004 Intel Science Talent Search Finalists

Out of 40 Students



Source: National Foundation for American Policy interviews with finalists and parents. Note: Totals add up to more than 40 and 100 percent since Student Visa Holders later also received H-1B status to stay in the United States.

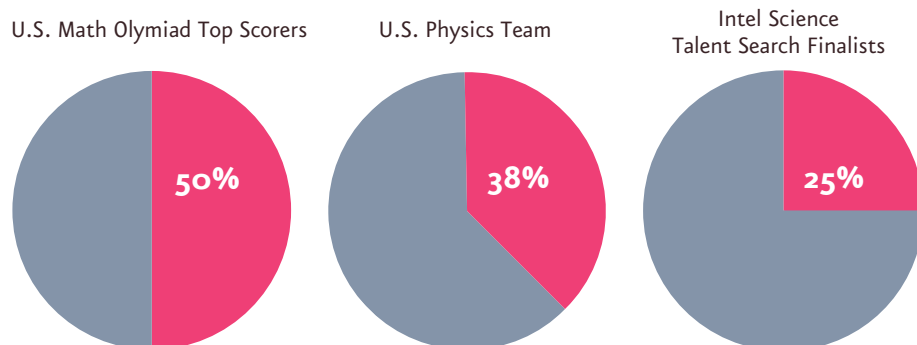
the cap. Soon a vicious cycle may emerge that will harm the United States' future competitiveness in science and technology: Without a cap increase in the near future, employers would soon face year-long waits to hire new professionals out of U.S. colleges, as backlogs from previous H-1B applications soak up visas that would have gone to new hires. Finding they are forbidden to engage in such new hiring inside the United States, U.S. companies will hire more highly skilled people outside the country. And realizing that a U.S. education is not likely to lead to employment in the United States, many international students will decide to attend universities elsewhere.

Keeping the Door Open

While some have decried the "exporting" of U.S. jobs and intellectual capital, many of those individuals also oppose the nation's openness to skilled professionals and students entering the country on temporary visas, ironically, a key source of maintaining and expanding the United States' intellectual base in science, mathematics, and technology. Previously it was thought with these restrictions on immigration the United States lost only the skills of such professionals. Now we understand the United States loses those professionals' children, too, perhaps an even more significant blow.

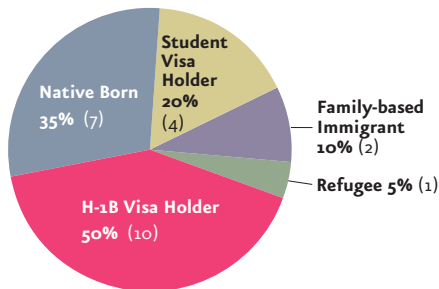
Those who wonder from where the next generation of U.S. scientists and mathematicians will come should look closely at the small children standing next to their parents as they take the oath of citizenship to the United States of America. Closing

Table 4 Students Who Are Immigrants in 2004 Competitions
Percentage of Foreign-Born Students



Source: National Foundation for American Policy interviews with students and parents.

Table 6 **Immigration History of Parents of 2004 Math Olympiad Top Scorers Out of 20 Students**



Source: National Foundation for American Policy interviews with finalists and parents. Note: Totals add up to more than 20 and 100 percent since Student Visa Holders later also received H-1B status to stay in the United States. Canadian participants and one participant on a student visa from Thailand were not included.

the door to immigrants, students, and skilled professionals hurts the United States today—and for a generation yet to come.

— Stuart Anderson, former staff director of the Senate Immigration Subcommittee, is executive director of the National Foundation for American Policy, a nonpartisan public policy research organization in Arlington, Virginia.

Endnotes

1. Interviews with author; Intel Science Talent Search 2003 Winners, Intel STS. Unless otherwise noted, all quotations were obtained from personal interviews with students, parents, or event and team organizers.

2. In FY2004, a cap of 65,000 new H-1B visa holders has been in force, in addition to allowing an estimated 15,000 individuals who are exempt from the cap, including those hired by universities, according to the Department of Homeland Security. Previous years had somewhat higher totals but would remain less than 0.04 percent of the U.S. population.

3. William J. Broad, "U.S. Is Losing Its Dominance in the Science," *The New York Times*, May 3, 2004.

4. "An Emerging and Critical Problem of the Science and Engineering Labor Force," *A Companion to Science and Engineering Indicators 2004*, The National Science Board, National Science Foundation, January 2004. Skill-related visas include H-1B, L-1, H-3, O-1, O-2, and TN visas. Visa applications refused for F-1 students increased from 27.3 percent in 2001 to 35.2 percent in 2003. For J-1 exchange visitors, the number refused increased from 7.8 percent to 15.9 percent between 2001 and 2003.

5. "Council of Graduate Schools Survey Finds Widespread Declines in International Graduate Student Applications to U.S. Graduate Schools for Fall 2004," Press Release, March 2, 2004, Council of Graduate Schools.

6. Stuart Anderson, *In Defense of a Nation*, The Military Contributions of Immigrants, Empower America and the American Immigration Law Foundation, 1996; and Laura Fermi, *Illustrious*

Immigrants, Chicago: University of Chicago Press, 1968, pp. 187 and 290.

7. *The New Americans*, National Academy of Sciences, 1997 (advance copy), Chapter 8, p.15.

8. *Science and Engineering Indicators 2004*, The National Science Board, National Science Foundation, January 2004.

9. *The New Americans*, Chapter 8, p. 15.

10. 2004 Finalists, booklet from Intel Science Talent Search, 2004, p. 3. Previously the Westinghouse Foundation sponsored the competition. The Intel Corporation became the new sponsor in 1998.

11. Facts and Official Entry Form, 2003–04, Intel Science Talent Search, p. 7.

12. In 1990, Congress redesignated the H-1 visa as H-1B and set an annual cap of 65,000 and made other changes.

13. Finalists, p. 11. Interview with author.

14. Finalists, p. 17.

15. *Ibid.*, p. 17.

16. *Ibid.*, p. 7.

17. Steve Olson; *Count Down*, Houghton Mifflin Co., New York, NY, 2004, pp. 141, 150.

18. *Ibid.*, pp. 41–42.

19. These totals for the U.S. Math Olympiad did not include Canadians and one international student from Thailand who participated.

20. *Ibid.*, pp. 145–46.

21. *Ibid.*, p. 146.

22. "NSTA Cites Neglect of K-12 Science Education as Cause for Low Benchmark Achievement on ACT Science Test," Press Release, National Science Teachers Association, August 21, 2003.

23. See note 3.