

H-1B HIGHLY EDUCATED FOREIGN PROFESSIONALS

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- No Visas? No Work for Some Grads (Charlotte Observer (North Carolina), December 31, 2004)
- America's Looming Creativity Crisis, (Harvard Business Review October 2004)

Model letters in support of Increased Access to H-1B Visas can be found on "Contact Congress/Media" under the Advocacy Center on both InfoNet and AILA.org.

HIGHLY EDUCATED FOREIGN PROFESSIONALS: KEY CONTRIBUTORS TO AMERICA'S ECONOMIC ACHIEVEMENT

THE ISSUE: The H-1B visa program, which allows U.S. employers to hire highly educated foreign professionals on a temporary basis, helps fulfill the need for professional workers essential to both our economic development and our nation's ability to compete in a global environment. However, changes to the visa program are needed to allow for adequate access to these highly educated foreign professionals.

Through the H-1B program, U.S. employers are able to hire, on a temporary basis, highly educated foreign professionals for "specialty occupations"-- jobs that require at least a bachelor's degree or the equivalent in the field of specialty. Examples include doctors, engineers, professors, accountants, researchers, medical personnel and computer professionals. Besides using these foreign professionals to obtain essential skills or rare and unique knowledge, U.S. employers use the program to acquire special expertise in overseas markets, trends or distribution (therefore allowing U.S. businesses to compete in global markets), or to alleviate temporary shortages of U.S. professionals in specific occupations.

Employers would not go through the extra burdens, costs, and delays of hiring foreign professionals through the H-1B program if they were able to find U.S. workers with the required expertise. Application processing times currently are taking anywhere from 3 to 5 months. This lengthy adjudication process is further compounded by Department of State delays in issuing visas. Employers thus may have to wait for over half a year before filling a specific professional position.

In addition to long delays, Congress also required employers to pay an additional \$1,500 training fee in addition to a \$500 anti-fraud fee and other fees and related costs. In the past, employer-paid training fees totaled more than \$692 million and helped the federal government provide training to more than 55,600 U.S. workers. These fees also have been used to fund scholarships for more than 12,500 U.S. students in science and engineering.

BACKGROUND: As the American economy grew in the last decade, U.S. businesses found that rigidity in the H-1B program threatened the economic boom since it did not permit the program to adjust to meet the demand for highly educated professionals. As a result, the American Competitiveness in the 21st Century Act (AC21) (P.L. 106-313) increased the program's numerical cap to 195,000 for three fiscal years. Although these additional numbers helped ensure that H-1Bs filled vacancies across our economy, the temporary elevation of the numerical cap failed to provide the program with a long-term solution that reflected how and why U.S. employers utilize these highly educated foreign professionals. As a result, the numerical restriction reverted to 65,000 on October 1, 2003, and the cap was reached 5 months into fiscal year 2004.

In FY 2005, the cap was hit on October 1, the very first day of the fiscal year. In response, Congress passed the H-1B Reform Act of 2004 as part of the Consolidated Appropriations Act of 2005 ("omnibus bill") (P.L. 108-447, H.R. 4818). This Act created a permanent exemption from the H-1B cap for graduates of U.S. universities who have earned a Master's or higher degree. However, this exemption is capped at 20,000 per year and does not meet the needs of American businesses. The Act also makes permanent the H-1B training fee, the non-displacement and recruitment attestations for H-1B-dependent employers, and the Department of Labor Investigative authority. In addition,

the law imposes a new \$500 “fraud detection and prevention fee”. While these measures were necessary to prevent U.S. employers from facing a year-long H-1B visa blackout, it is unlikely that this limited relief from the H-1B cap will be sufficient.

Many industries continue to need highly educated professionals for numerous reasons. In the science-oriented sectors, employers often need a professional with cutting edge skills and unique expertise, and find that qualified American workers are not always available to fill these positions. In other fields, such as education, shortages still exist in specific areas of the country and positions continue to go unfilled. In these instances, H-1B professionals play a vital role in educating our children. In other business contexts, U.S. companies may turn to the H-1B visa program when they need professionals with unique skill sets to help develop new products, platforms and programs, enter new markets, and expand the client base. The result is increased productivity and an increase in the number of jobs for American workers.

Preserving Homegrown Talent—U.S. employers also turn to H-1B professionals when they recruit post-graduates from U.S. universities. Foreign students represent half of all U.S. graduate enrollments in engineering, math and computer science. There still are not enough U.S. students graduating with advanced degrees to fill highly specialized positions and, according to the Bureau of Labor Statistics (BLS), the demand for these graduates will only increase. BLS figures indicate a 47% growth in science and engineering jobs and an 82% increase in computer related jobs over the next ten years. It is thus imperative that U.S. businesses have access to foreign professionals who have graduated from U.S. Masters and Ph.D. programs.

Furthermore if we cannot keep this homegrown talent in the U.S., our competitors abroad will profit. Foreign countries, such as Germany, recently have updated their immigration laws to attract highly educated talent. If our immigration laws do not allow these professionals with cutting edge knowledge to remain in the U.S., they will go to work for our competitors and additional jobs that could have remained in the U.S. will follow them abroad. A workable H-1B program that gives U.S. employers the access they need to highly educated professionals will keep the world’s brightest minds in the U.S. and help retain jobs in America.

Protecting U.S. Workers—Notwithstanding the need for highly educated foreign professionals, the H-1B program does not allow the use of the H-1B program to harm U.S. workers. The H-1B program has built-in safeguards to ensure that highly educated foreign professionals do not undercut the wages offered U.S. workers. Employers must offer the foreign professional a wage that is the **higher** of either the typical wage in the region for that type of work (“prevailing wage”), or what the employer actually pays existing employees with similar experience and duties. A U.S. employer using this program must guarantee that: (1) the foreign professional will be paid at or above the rate paid for a similar position at the employer’s own offices, or at those of its local competitors; (2) the foreign professional will not adversely affect the working conditions of U.S. colleagues; (3) U.S. colleagues will be given notice of the professional’s presence among them; and (4) there is no strike or lockout at the worksite. The employer also must demonstrate that the position requires a professional in a specialty occupation and that the intended employee has the required qualifications.

The law also requires that employers pay a training fee and fraud fee when they submit a petition for an H-1B professional. This \$1,500 fee (\$750 for employers with fewer than 25 full-time workers) goes to fund scholarship programs, job training initiatives and grant programs that offer U.S. workers the chance to improve their job-related skills. The \$500 fraud prevention and detection fee is split among the Department of State, Department of Homeland Security and Department of Labor in order to fund their anti-fraud efforts.

Employers who use a higher percentage of H-1B visas must meet additional requirements, including documenting recruitment in the U.S., and are forbidden from laying off American workers to hire an H-1B professional. Penalties for companies that violate the law include fines of up to \$35,000, a three-year bar from participating in visa programs, and repayment of salaries and benefits to any under-paid foreign professional.

AILA's POSITION: The H-1B visa is a tool to keep the U.S. economy vibrant and jobs in America. Highly educated foreign professionals allow U.S. employers to develop new products, create groundbreaking research, implement new projects, expand operations, create additional new jobs, and compete in the global marketplace. The very limited relief included in the H-1B Reform Act of 2004, is inadequate to meet the needs of American businesses. H-1B professionals remain essential to fill specific positions in companies across the country and as our economy improves, the need for access to this important visa program will continue to grow.

As the U.S. economy improves and demand increases, U.S. employers will need increased access to these professionals. If the H-1B program cannot give U.S. employers such access, the consequence could be detrimental to America's economy. In the short term, limitations on access would prevent employers from fully utilizing the special skills of these highly educated foreign professionals. In the longer term, such rigidity would limit our labor market supply of these available professionals, thereby hampering our economic vitality. The result will be American jobs lost and American projects losing out to foreign competition. Congress needs to support an H-1B program that reflects our nation's need for these professionals and allows U.S. employers' access now and in the future to the talents of these highly educated foreign professionals.

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H-1B PROFESSIONALS AT A GLANCE

Who Are H-1B Professionals:

- **Temporary highly educated professionals:** H-1B visa holders are foreign professionals who are hired by a U.S. employer to temporarily fill “specialty occupations,” those jobs requiring a bachelor's degree or the equivalent. H-1B professionals include teachers, doctors, engineers, professors, lawyers, physical therapists, and computer professionals.
- **Comprise a low percentage of the workforce:** During the economic boom, when H-1B professionals were at their height, these temporary professionals comprised less than **one-tenth of one percent** of the U.S. workforce of more than 127 million people.

Employers Hire H-1B Professionals for Three Reasons:

- **To provide specialized or unique skills:** Employers hire H-1B professionals to obtain cutting edge technical skills or expertise that is relatively unique and not readily found in the U.S. Roughly half of the students graduating with advanced degrees from U.S. universities in math and sciences are foreign nationals. If U.S. employers cannot hire these professionals with cutting edge knowledge and research experience, they will go abroad and work for our competitors.
- **To relieve temporary worker shortages:** H-1B professionals fill positions when there is a temporary shortage of workers with specific skills in a specific field, thus allowing employers to respond quickly to shifts in the labor market.
- **To supply global market expertise:** Employers often need H-1B professionals who bring special expertise in overseas needs, markets or trends that enable U.S. businesses to compete globally.

Employers Must Protect U.S. Workers When They Hire H-1B Professionals:

- **Help Train and Protect Americans:** Employers must pay a \$1,500 training fee for each H-1B petition they file in addition to the other fees associated with the H-1B visa program. This fee goes to scholarship and other training programs to help train Americans in critical industries. In addition, employers must pay a \$500 fraud prevention and detection fee to fund efforts to detect and prevent fraud in the visa program.
- **Safeguard wages and working conditions:** Employers must pay each H-1B professional a wage that is the higher of either the typical wage in the region for that type of work (“prevailing wage”), or what the employer actually pays existing employees with similar experience and duties. Employers cannot use H-1B professionals to break a strike and must notify their U.S. workforce when hiring an H-1B professional. Employers cannot make the H-1Bs work under conditions different from their U.S. counterparts, including hours, shifts and benefits.
- **Recruit in the U.S. and not displace U.S. workers:** Employers who use a lot of H-1B visas first must try to find U.S. workers before they can hire an H-1B professional. They also must attest that they

are not using an H-1B visa if they have laid-off or displaced a similarly situated U.S. worker. Employers who fail to comply with Department of Labor regulations may be subject to investigation, civil and administrative penalties, payment of back wages, and even debarment from participating in key immigration programs.

Numerical Cap on H-1B Professionals:

- **A rigid cap restricts employers' access to professional workers:** The visa is limited to 65,000 initial visas per fiscal year plus an annual cap exemption of 20,000 visas for H-1B beneficiaries who have graduated from a U.S. university with a Masters degree or higher. The U.S. needs increased access to H-1B professionals. Congress and the Administration must develop new mechanisms to ensure that American companies have access to this vital visa program.

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H-1B EXAMPLES

The H-1B program was created in 1952 to provide American employers with access to highly educated foreign professionals who have unique knowledge in specialized areas or expertise in overseas markets. These professionals help U.S. companies to develop new products, enter new markets, expand their client base, and create jobs and products.

Below are examples of H-1B professionals and their contributions to our economy and society.

WORKING TO IMPROVE THE LIVES OF AMERICANS

- A Chicago-based hospital group that employs over 25,000 individuals and 3,500 physicians, and provides care at 250 different sites throughout Chicago augments its medical staff in community based hospitals operates by using the H-1B program to hire foreign physicians.
- In Indiana, the H-1B program is used to augment the insufficient number of trained physical therapists and occupational therapist needed by healthcare companies, hospitals and nursing homes. This shortage is fueled by a restricted number of U.S. graduates in this field of study. Without the H-1B program, many Americans would not receive the care they need, particularly in the rural areas of Indiana.
- Several major health agencies in New York City rely on the H-1B program to hire psychologists and special education instructors to work with the profoundly mentally challenged. Without these extra manpower provided by these foreign professionals, the health care and rehabilitation of these special Americans would be negatively impacted.
- School districts in Connecticut rely on foreign teachers to fill-in where American teachers are not available. The exhaustion of the H-1B cap precluded many of these schools from hiring available foreign teachers. The result is an increased cost for the school for substitute teachers and increased disruption for the students who do not have a full time teacher.
- A school district in Texas is desperate for qualified bilingual teachers. An elementary school lost the opportunity to hire a prospective teacher due to exhaustion of the H-1B cap.
- A rural, predominately African American school system in Alabama was unable to hire a math teacher from Kenya who was certified to teach by the state of Alabama. Even though the school year had started, the school system had still had openings due to a lack of qualified applicants.
- In Georgia, a chiropractor from Canada with an unusual specialty of working with Parkinson's patients and other neurological disorders will be forced to forego a job offer to work with a U.S. medical practice due to the exhaustion of the H-1B visa.
- An H-1B professional was instrumental in the engineering of a synthetic human skin that has a low rate of rejection. This new skin can now be used to help burn victims and for other medical applications.

- A California-based pharmaceutical company has developed a potent drug to treat HIV and AIDS. The company employs several researchers through the H-1B program. Without these researchers, the company would have been unable to continue its research and development programs for new drugs in the fight against AIDS and would also have lost its competitive edge to foreign pharmaceutical companies in the release of the next generation of therapeutic products.
- Two schools in Manhattan and California, devoted to working with children with cerebral palsy, have used the H-1B category to bring in several teachers from Hungary who have been trained in a special technique unavailable in the United States called “conductive therapy.” Parents of U.S. children helped by these teachers call their children’s progress “miraculous.”
- A government contractor in Colorado hired several H-1B engineers with expertise in the decontamination of former nuclear weapons facilities. Their expertise is being used to clean up several Department of Energy facilities that formerly were used in this nation’s nuclear weapons complex.

WORKING TO IMPROVE OUR ECONOMY THROUGH INNOVATION, CLIENT BASE EXPANSION & JOB CREATION

- A division of a large California multinational industrial company that develops composite materials for aerospace applications hired an H-1B engineer with significant experience working in the European Aerospace industry to oversee its contracts with European manufacturers and ensure compliance with all European standards and requirements.
- A Connecticut manufacturing development center employs Ph.D. researchers on H-1B professional visas to perform critical research on heat distortion control and the optimization of heat treatment processes for the manufacture of a bearing product line.
- A Massachusetts research and engineering company specializes in the design and development of turbo-machinery products and the development of analytical software used by the industry to solve engineering and manufacturing problems. The company has targeted the Asia/Pacific region for expansion of its products, and requires CAD/CAM Sales Engineers who are not only technical experts in the field, but can communicate on a technical level in Mandarin Chinese, and have a cultural understanding of how to do business in that region. The use of H-1B professionals has enabled this company to enter these markets and the result has been increased market share of this U.S. company in China.
- A Michigan aerospace and defense systems engineering company conducted a nationwide search for a senior software engineer and received only one application. The company hired an H-1B professional to undertake critical work for the Flight Management System of the Airbus 320 project, so that other engineers could focus on U.S. government defense projects.

ARTICLES ON H-1B VISAS

No Visas? No Work for Some Grads
Charlotte Observer (North Carolina)
December 31, 2004
By Danica Coto

For the first time since they were created in 1990, work visas for foreign college graduates ran out this year the day they were offered - worrying job-seekers and surprising local attorneys.

Because the government cut the number of visas available by more than half, students who graduated now face two choices: Find money to re-enroll in school or return to their native country.

The rationale behind the cuts was that the computer boom had slowed, said Mark Krikorian, executive director of the Center for Immigration Studies, a research organization in Washington, D.C. The majority of visas issued in 2002 went to foreigners working in computer-related fields.

Advocates for increasing work visas say companies benefit from employees who have specialized degrees and bring knowledge from abroad. But some critics say it's an attempt to bring in cheap labor that takes jobs from Americans.

"Also, since 9-11, any immigration has become controversial," Krikorian said. "Politically speaking, it's problematic for Congressmen because they're leery of the issue."

The H-1B visas are issued to college graduates looking for skilled jobs in the United States. It allows them to work for three years at a time, up to six years.

On Oct. 1, the visas became available and were snapped up that same day.

"There was no warning," said Charlotte immigration lawyer Alan Gordon. "If you're going to run out on the first day, that's just like Target opening up for a sale and closing after half an hour saying, 'We ran out of inventory.'"

Last year, the visas ran out in February, five months after they were made available. Before that, they ran out in September, said Chris Bentley, spokesman for U.S. Citizenship and Immigration Services. Kashif Hamid, 27, enrolled for his doctoral degree this year at UNC Charlotte after earning a master's in electrical engineering from the school.

He'd rather be working. But companies interested in hiring him found out he needed an H-1B visa and stopped calling.

"They disappeared," he said. "Honestly, I'm a little disheartened right now. I'm struggling a lot."

The U.S. Citizenship and Immigration Services department consistently updated the public on the number of petitions it had been receiving for visas, Bentley said. But like any projection, it's not 100 percent accurate, he said. It's unclear how many Carolinas employers applied for the visa and how many people received it. Bentley said the Citizenship and Immigration Services office in Atlanta compiles the data and doesn't break it down by state.

The visas ran out so quickly in fiscal year 2004 because the number available dropped from 195,000 to 65,000.

"It's been a tough year," said Charlotte immigration attorney Chris Green. "We never had to be concerned with the cap."

Demand this year was so great for H-1Bs that President Bush signed a legislation making 20,000 more available to foreigners with graduate degrees from American universities. The H-1Bs that ran out were for foreign students with undergraduate and graduate degrees from any country.

The availability of visas should depend on employment conditions in the United States, said Jack Martin, special projects director for the Federation for American Immigration Reform.

"We think that we have an obligation for providing job opportunities for Americans first," he said. "For us, it doesn't make any sense to be allowing so many high-tech workers into the country, let alone increasing the number of visas."

Foreigners can apply for other types of visas, and those graduating from a U.S. college can work here for one year if they qualify for an optional training authorization.

The problem is that some employers don't want to petition for an H-1B visa during that time, said David Guo, 31, a computer science graduate student at UNC Charlotte who graduates this month.

He's offered to start working under the OPT, but companies are wary because the work visas are so limited and difficult to obtain, he said.

"Many employers feel reluctant to hire you," Huo said.

Some students re-enroll in school and wait until more visas are available, said Marian Beane, director of the international student scholar office at UNC Charlotte. "It's a game they have to play and work really carefully at staying in school until a job comes along," she said.

Other students leave the country and plan to come back, but many companies aren't able to say, "A year from now, we'll hire you," Beane said.

Immigrants from India, China and Canada were the top three recipients of the visas in 2002, according to a 2003 Department of Homeland Security report. The bulk of the visas in 2002 went to those between the ages of 24 and 35, and most were issued to people working in computer-, architecture- and engineering-related fields.

Hamid wants to work in those fields. But he has talked with his father, who works for the United Nations and lives in Pakistan, about going home.

"That's something that's in the back of your mind," he said. "But I surely want to stay here because I spent so much time in this country learning, and I want to get experience here. Better research is done here."

America's Looming Creativity Crisis
Harvard Business Review
October 2004
By Richard Florida

The strength of the American economy does not rest on its manufacturing prowess, its natural resources, or the size of its market. It turns on one factor--the country's openness to new ideas, which has allowed it to attract the brightest minds from around the world and harness their creative energies. But the United States is on the verge of losing that competitive edge. As the nation tightens its borders to students and scientists and subjects federal research funding to ideological and religious litmus tests, many other countries are stepping in to lure that creative capital away. Ireland, Canada, Australia, New Zealand, Denmark, and others are spending more on research and development and shoring up their universities in an effort to attract the world's best--including Americans. If even a few of these nations draw away just a small percentage of the creative workers from the United States, the effect on its economy will be enormous. In this article, the author introduces a quantitative measure of the migration of creative capital called the Global Creative-Class Index. It shows that, far from leading the world, the United States doesn't even rank in the Top 10 in the percentage of its workforce engaged in creative occupations. What's more, the baby boomers will soon retire. And data showing large drops in foreign-student applications to U.S. universities and in the number of visas issued to knowledge workers, along with concomitant increases in immigration in other countries, suggest that the erosion of talent from the United States will only intensify. To defend the U.S. economy, the business community must take the lead in ensuring that global talent can move efficiently across borders, that education and research are funded at radically higher levels, and that we tap into the creative potential of more and more workers. Because wherever creativity goes, economic growth is sure to follow.

The United States of America--for generations known around the world as the land of opportunity and innovation--is on the verge of losing its competitive edge. It is facing perhaps its greatest economic challenge since the dawn of the industrial revolution. This challenge has little to do with business costs and even less with manufacturing prowess. And, no, the main competitive threats are not from China or India.

Even though the United States led the world into the era of high-tech industry and constant innovation, it is by no means the nation's manifest destiny to stay on top. In fact, the great majority of U.S. business and political leaders, academics, and economic analysts fail to grasp the true reason behind American success in innovation, economic growth, and prosperity. It is not the country's generous endowment of natural resources, the size of its market, or some indigenous Yankee ingenuity that has powered its global competitiveness for more than a century. America's growth miracle turns on one key factor: its openness to new ideas, which has allowed it to mobilize and harness the creative energies of its people.

As Stanford University economist Paul Romer has long argued, great advances have always come from ideas. Ideas do not fall from the sky; they come from people. People write the software. People design the products. People start the new businesses. Every new thing that gives us pleasure or productivity or convenience, be it an iPod or the tweaks that make a chemical plant more efficient, is the result of human ingenuity.

True, the United States is still the world's center of ingenuity. Its GDP tops \$ 10 trillion, and it is home to great universities, Silicon Valley, and many of the most dynamic companies in information technology, biotech, entertainment, and countless other fields. But the global talent pool and the high-end, high-margin creative industries that used to be the sole province of the U.S., and a crucial source of its prosperity, have begun to disperse around the globe. A host of countries--Ireland, Finland,

Canada, Australia, New Zealand, among them-are investing in higher education, cultivating creative people, and churning out stellar products, from Nokia phones to the Lord of the Rings movies. Many of these countries have learned from past U.S. success and are shoring up efforts to attract foreign talent-including Americans. If even a handful of these rising nations draws away just 2% to 5% of the creative workers from the U.S., the effect on its economy will be enormous. The United States may well have been the Goliath of the twentieth-century global economy, but it will take just half a dozen twenty-first-century Davids to begin to wear it down.

To stay innovative, America must continue to attract the world's sharpest minds. And to do that, it needs to invest in the further development of its creative sector. Because wherever creativity goes-and, by extension, wherever talent goes-innovation and economic growth are sure to follow.

The Dawn of the Creative Age

There's a whole new class of workers in the U.S. that's 38 million strong: the creative class. At its core are the scientists, engineers, architects, designers, educators, artists, musicians, and entertainers, whose economic function is to create new ideas, new technology, or new content. Also included are the creative professions of business and finance, law, health care, and related fields, in which knowledge workers engage in complex problem solving that involves a great deal of independent judgment. Today, the creative sector of the U.S. economy, broadly defined, employs more than 30% of the workforce (more than all of manufacturing) and accounts for nearly half of all wage and salary income (some \$ 2 trillion)-almost as much as the manufacturing and service sectors together. Indeed, the United States has now entered what I call the Creative Age.

The roots of the Creative Age in the U.S. can be traced to the years surrounding World War II. After the war, federal funding for basic research jumped considerably, and so did the number of people pursuing higher education, thanks in part to the GI Bill. In the private sector, the newly formed venture capital industry provided an avenue for bringing research ideas to market. The social movements of the 1960s popularized the idea of openness; to be different was no longer to be an outcast but to be admired. Freedom of expression allowed new technologies and cultural forms to flourish-from biotechnology to alternative rock.

But the United States doesn't have some intrinsic advantage in the cultivation of creative people, innovative ideas, or new companies. Rather, its real advantage lies in its ability to attract these economic drivers from around the world. Of critical importance to American success in this last century has been a tremendous influx of talented immigrants. Immigrants have, of course, helped power American growth since the dawn of the Republic. But since the 1930s, the U.S. has welcomed a stream of scientific, intellectual, cultural, and entrepreneurial talent, as Europeans fled fascism and communism. This talent has helped make the U.S. university system and innovative infrastructure second to none.

The stream surged to historic levels in the 1980s and 1990s, thanks to more liberal immigration policies and a booming economy. In the 1990s alone, U.S. census figures reveal, more than 11 million people came to America. The largest wave of immigration in U.S. history, it brought with it talent from all corners of the globe. Think of high-tech luminaries Sergey Brin, the Moscow-born cofounder of Google, and Hotmail cofounder Sabeer Bhatia, who grew up in Bangalore. The foreign-born population of the United States currently numbers more than 30 million, or some 11% of the population.

The Creativity-Competitiveness Connection

But already the percentage of the population represented by immigrants is higher in Canada (18%) and Australia (22%) than in the United States. These countries understand that today's global economy

centers on competition for people rather than for goods and services. As Pete Hodgson, New Zealand's minister for research, science, and technology, recently explained to me, "We no longer think of immigration as a gatekeeping function but as a talent-attraction function necessary for economic growth."

A close look at international statistics shows that the creative class represents a larger percentage of the workforce in many other countries than it does in the United States. Along with Irene Tinagli, a doctoral student at Carnegie Mellon, I set out to compare the size of the creative class in different countries by establishing the "Global Creative-Class Index" (GCCCI). Using employment data and the job classifications established by the International Labour Organization (ILO), the index is a straightforward calculation of the number of people employed in creative job categories in each country divided by the country's total number of workers. In the exhibit, "The Global Creative-Class Index," we compare the percentage of workers in the creative classes in 25 nations.

Far from being the leader, the United States is not even in the top ten. The creative class constitutes around a third of the workforce in Ireland, Belgium, Australia, and the Netherlands; it accounts for roughly a quarter of the workforce in six other countries: New Zealand, Estonia, the United Kingdom, Canada, Finland, and Iceland. When our U.S. data are adjusted to be comparable to the ILO figures (which use a narrow definition of creative job categories that excludes "technicians"), the United States comes in, with 23.6%, at 11th, worldwide. Of course because the overall workforce in America is so large, that translates into a sizable group in absolute numbers-some 30 million people.

Still, if technicians are included in the international analysis, the creative class rises to more than 40% in some eight countries: the Netherlands (47%), Sweden (42.4%), Switzerland (42%), Denmark (42%), Norway (41.6%), Belgium (41.4%), Finland (41%), and Germany (40%). It constitutes more than 30% of the workforce in virtually all the remaining countries. What's more, the growth rate of the creative class in several nations has been phenomenal over the past decade or so. Since 1991, for instance, New Zealand's creative class has jumped from 18.7% to 27.1%, and Ireland's has nearly doubled, starting from the same 18.7% and rising to 33.5%.

In today's economy, creativity and competitiveness go hand in hand. It's not surprising, then, that our GCCCI rankings correlate closely with results from other studies of international competitiveness. Harvard Business School's Michael Porter, for instance, ranked the United States as the world's most competitive nation in his initial 1995 global Innovation Index. According to Porter's projections, by 2005, the U.S. will have tumbled to sixth among the 17 member countries of the Organisation for Economic Co-operation and Development (OECD)-trailing (in order) Japan, Finland, Switzerland, Denmark, and Sweden. The 2004 Globalization Index developed by A.T. Kearney and published in Foreign Policy ranks the United States seventh, behind Ireland, Singapore, Switzerland, the Netherlands, Finland, and Canada.

Rankings of individual companies' competitiveness yields similar results. According to BusinessWeek's 2004 Information Technology 100, for instance, only six of the world's 25 most competitive high-tech companies are based in the United States, while 14 are in Asia.

In the area of patents and publications, America's formidable lead has been eroding, as well. Today, foreign-owned companies and foreign-born inventors account for nearly half of all patents issued in the United States. A study by CHI Research found that inventors in Japan, Taiwan, and South Korea alone account for more than a quarter of all U.S. industrial patents awarded each year. In terms of publications, the National Science Board reports that back in 1988, U.S. scientists produced 178,000 scientific papers, or 38% of all scientific and engineering papers worldwide. But by 2001, the European Union nations were the largest producers of scientific literature. In the field of physics, the U.S. lead fell from 61% of all publications in 1983 to 29% in 2003, according to Physical Review.

Taken individually, none of those facts would be cause for concern about the future of the United States. It is, after all, a very rich country with diverse strengths. Cumulatively, though, the data create an unsettling picture of a nation that's allowing its creativity infrastructure to decay. Add to that greater security concerns and a highly politicized scientific climate, and it's easy to see why the nation is becoming less and less attractive to the world's brightest minds.

The Talent Gap

Today, virtually the entire public dialogue about jobs in the United States revolves around outsourcing and unemployment. But these are the short-term issues. The real long-term predicament facing the United States and the world is the looming shortage of creative talent.

Economists like Lawrence Summers, president of Harvard University and a former Treasury secretary, and Edward Montgomery, a former Labor Department deputy secretary, view the shortage of skilled and talented workers as all but inevitable. A 2003 National Association of Manufacturers report concurs, predicting that a skilled-worker gap will start to form in 2005, widening to 5.3 million workers by 2010 and 14 million by 2020. The labor shortages that plagued high-tech companies in the halcyon days of 1999 and 2000 will look like a "minor irritation" in comparison, contends labor market expert Anthony Carnevale, the report's author.

The cause of this labor squeeze is easy to see: Baby boomers now constitute about 60% of the prime-age workforce—that is, workers between the ages of 25 and 54. In the coming decades, boomers will retire in massive numbers, and there simply aren't enough younger workers to take their places. The talent shortage will hit every sector of the U.S. economy, but it will be felt most acutely at the cutting edges of science and engineering. Since 1980, the number of jobs in those segments has grown four times faster than the overall employment rate, and the Bureau of Labor Statistics expects that number to swell by nearly 50% again by 2010—adding a further 2.2 million new jobs. At the same time, the average age of the scientific and technological worker is rising. More than half are 40 or older, and many will leave the workforce in the next two decades.

You don't have to be a rocket scientist to figure out that there is only one way for the United States to fill this gap: foreign talent. Former director of the U.S. Census and Columbia University professor Kenneth Prewitt says that the United States will increasingly depend on these "replacement people" to provide vital skills and grow new industries. But that may not be as easy as it once was.

The Canaries of the Talent Mine

Students are a leading indicator of global talent flows. The countries and regions that attract them have a leg up on retaining them and also on attracting other pools of foreign talent—scientists, researchers, inventors, entrepreneurs.

For decades, international students have flocked to the United States to take advantage of the world-class education offered there. In the 2002-2003 academic year alone, according to the Institute of International Education (IIE)—the body that grants the Fulbright scholarships—roughly 585,000 foreign students attended U.S. colleges and universities, up from less than 50,000 in 1960, and international education contributed \$ 12.9 billion to the U.S. economy. But in 1999, well before anyone had heard the phrase "dot-com collapse," the Council on Competitiveness had warned that the nation should not count on keeping the international students who come to study at elite universities.

More recently, a March 2004 report by the Council of Graduate Schools found that international student applications for fall 2004 admission had dropped sharply at 90% of the graduate schools responding to its survey. The total decline was 32%. Applications fell off most from the countries that have traditionally sent the most students: More than half of all foreign-born graduate students hailed

from Asia, including 14% from India and 10% from China. The figures show that the number of Chinese students applying to U.S. graduate schools declined by 76%, and the number of Indian students was 58% lower than it was the previous year. Signs don't point to a turnaround anytime soon. The Educational Testing Service found that one-third fewer international students applied to take the Graduate Record Examinations (GREs) for the 2004 academic year than they did for 2003. The number of Chinese test takers was down 50%; Taiwanese, 43%; Indians, 37%; and Koreans, 15%.

One reason for this is good news from a global perspective. Several major economies-most notably India's and China's-have grown to the point where they can offer great opportunities for people who stay or return home. Both of those countries are investing heavily to build excellent university systems of their own. Peter Drucker said recently that India may already have the greatest engineering and medical schools in the world.

Foreign students are not only finding attractive educational opportunities in other countries, they are also facing obstacles to studying in the United States. A survey of educators at 276 U.S. campuses conducted by the IIE found a significant drop in enrollment to U.S. universities in fall 2003 from students whose home countries have large Islamic populations, especially United Arab Emirates, Saudi Arabia, and Pakistan. Fifty-nine percent of respondents cited the visa application process as a reason for the decline.

The New York Times reports that the rejection rate for "cultural exchange" visas, used by many medical students, rose from 5.1% in fiscal year 2001 to 7.8% in fiscal 2003. And the number of students whose visas were rejected rose from 27.6% in FY2001 to 35.2% in FY2003, according to the National Science Board's Science Engineering Indicators-2004.

Having taught at several major universities-Ohio State, Harvard, MIT, and Carnegie Mellon-I've known many foreign students. They have always been quick to point out the benefits of studying and conducting research in the United States. But their impressions have changed dramatically over the past year. They complain of being hounded by immigration agencies as potential threats to security, and they feel that the war on terror is leading America to abandon its commitment to an open society. Many have told me they are thinking of leaving the U.S. for graduate education and professional positions in other nations. They also report that growing numbers of their friends and colleagues back home are no longer interested in coming to America for their education.

James Langer, vice president of the National Academy of Sciences, spoke plainly about what the drop in foreign students could mean. At a May 2004 luncheon for the United States Senate Science and Technology Caucus, he commented: "Applications to many leading U.S. graduate schools from students in China, India, Russia, and elsewhere are already down by 30% or more, and there is evidence that these students are going elsewhere for advanced degrees. International scientific organizations, such as the International Union of Pure and Applied Physics, are refusing to hold conferences here." As one oceanographer from the University of California at San Diego recently quipped, it may be time for academics in that part of the country to "have our scientific meetings in Tijuana," because at least there international experts can get in. In short, as Langer concluded, "American science is being isolated from the rest of the world."

Sadly, restricting foreign immigration will not open up more places for homegrown talent in the top American graduate programs and research facilities. The U.S. has many brilliant young people but not nearly enough to satisfy the demand the nation's powerhouse economy has created.

Other countries are taking full advantage of America's fading allure. English-speaking Canada, the United Kingdom, and Australia are particularly well placed to capitalize on this opportunity. In June 2003, an eminent Oxford professor told me that the university had "never seen so many applications from top international students," adding that these students seem to be "looking for alternatives to top

American universities" like Harvard, Chicago, MIT, and Stanford. In fact, together, the United Kingdom, Germany, France, Australia, and Japan attracted 650,000 foreign students-some 11% more than the United States-according to the 2003 Atlas of Student Mobility, compiled by the IIE. And the stakes are growing. In 2000, UNESCO estimates, 1.7 million students worldwide were educated abroad; by 2025, it expects that number will swell to more than 8 million. The countries that attract these students will have a huge advantage in the coming war for global talent.

The Reverse Brain Drain

For the first time in its history, then, the United States is confronting the possibility of a reverse brain drain. And students are just the tip of the iceberg. The evidence suggests that the country may be losing out on the talents of a host of foreign scientists, engineers, inventors, and other professionals. Visa delays have cost U.S. businesses roughly \$ 30 billion in two years, according to a June 2004 study commissioned by the Santangelo Group. The group is a consortium of leading U.S. industry organizations ranging from the Aerospace Industries Association to the National Foreign Trade Council to the Association for Manufacturing Technology, and its study was based on a survey of 734 of its member companies. Of the 141 companies that responded, 73% reported having had problems processing business visas since 2002, and the average financial impact per company was nearly a million dollars (\$ 925,816). Thirty-eight percent of respondents said that visa delays caused projects to be postponed, 42% said the delays prevented them from bringing foreign employees to the United States, and 20% said training events had to be relocated outside the country.

The direct-sales giant Amway, for instance, chose to hold a convention for its 8,000 South Korean distributors in Japan this year rather than in Los Angeles or Hawaii, the Washington Post recently reported, because the United States would require each visitor to go through an individual interview with a consular official. Amway estimated that the attendees would have spent, on average, \$ 1,250-translating into a \$ 10 million loss for the potential host city.

According to a recent New York Times article, 6.3 million people applied for U.S. visas between October 2000 and September 2001. But in fiscal 2003, that number dropped more than 40% to 3.7 million. And fewer of those who are applying are getting in. The rejection rate for H-1B visas (also called "high-skilled visas"), which allow professionals who are not U.S. citizens to work in the country for up to six years, increased from 9.5% to 17.8% between 2001 and 2003. Almost every major American industry from high-tech to entertainment is feeling the repercussions of these decisions. A number of prominent international music groups, such as Cuba's Sierra Maestra, have canceled American tours because they were refused visas. (Sierra Maestra was denied a visa when the FBI failed to complete background checks fast enough to meet INS deadlines.) These cancellations in and of themselves won't have a big impact on the U.S. economy, but think of the influence on American artists, let alone on the multibillion-dollar music business. Choking musicians and businesspeople off from those on the frontiers of this ever-evolving (and increasingly global) industry will eventually yield the same result as prohibiting scientists from carrying out potentially rewarding research. It will dull their competitive edge.

Foreign professionals already working in U.S. firms aren't having an easy go of it either. Processing times for renewing green cards and travel documents have reached glacial proportions. As the Times also reports, it now takes an average of 19 months to replace a lost green card. It takes seven months for legal workers in the U.S. whose green cards are pending to get travel papers-and during that period, the applicants cannot leave the country or they risk not being able to reenter. The same article claims that the number of pending green card applications has jumped by nearly 60% since 2001 because 1,000 agents who once issued documents have been reassigned to do "extensive security checks of every applicant instead."

There's no denying how important foreign-born workers are to the U.S. economy. AnnaLee Saxenian, dean of the School of Information Management and Systems at the University of California, Berkeley, conducted extensive research on immigrant-run companies in Silicon Valley. She and her team pored over census data on immigrants' education, occupations, and earnings, and they used a Dun Bradstreet database to distill immigrant-run companies from the nearly 12,000 start-ups launched between 1980 and 1998. They found that Chinese and Indian engineers were running nearly 30% of the area's high-tech companies in the 1990s-up from 13% in the early 1980s. Saxenian estimated that in 2000, these firms collectively accounted for nearly \$ 20 billion in sales and more than 70,000 jobs. And because Saxenian's database identified only those companies that are currently headed by a Chinese or Indian chief executive, she suspects her figures are conservative.

Trends are eye-opening, but individual cases are perhaps even more important. What if, for example, Vinod Khosla, the cofounder of Sun Microsystems and venture capital luminary who has backed so many blockbuster companies, had stayed in India? Or if An Wang, founder of Wang Laboratories, had gone to university in Europe? These are people whose creative genius has affected the trajectory of entire industries; their breakthroughs and business acumen have helped set in motion what the economist Joseph Schumpeter liked to call the "gales of creative destruction" that create new companies and industries and completely remake existing ones.

This circle-the-wagons mentality is even causing some leading American scientists and engineers to leave the country. If the status quo remains, then more people may react like Roger Pedersen, a stem cell researcher, who left the University of California, San Francisco, for Cambridge University. "I have a soft spot in my heart for America, but the UK is much better for this research. More working capital," Pedersen told Wired, "They haven't made such a political football out of stem cells." These tendencies illustrate on a small scale how the creative economy is being reshaped-both by global competitors' increasing savvy and by America's shortsightedness.

Rebuilding the Creative Infrastructure

What should the United States do? First, it must recognize that the issue is nonpartisan. Republicans, Democrats, independents-everyone has a stake in keeping the country open to foreign talent. The challenges the nation must overcome are too massive for the debate about them to become overshadowed by polarizing political bickering, culture wars, or short-term economic agendas. The United States must consider its next steps carefully and deliberately. I recommend focusing on three main areas.

Calculate the true cost of security. The United States is impeding its own progress when it makes scientific discovery pass religious tests or when it tightens visa restrictions unnecessarily. To be certain, America after September 11 does face real and vital threats to its security, and they are not going to disappear anytime soon. The departments of Defense and Homeland Security, the FBI, the Coast Guard, and the intelligence agencies naturally think in terms of security first. That is their job. But it is important for both business and political leadership to recognize the economic costs of overzealousness and to weigh carefully the serious trade-offs between current security and long-run competitiveness.

People around the world applaud America's efforts to improve its own security. But what the world does not like is the arbitrary and sometimes brash methods the country has adopted in its own defense. Over time, terrorism is less a threat to the United States than the possibility that creative and talented people will stop wanting to live within its borders. The nation must act in concrete ways to reassure people-both Americans and global citizens-that it values openness, diversity, and tolerance. To that end, it must focus on improving the visa process immediately.

If the government is unable or unwilling to take the lead in balancing one type of security with another, then the business and academic communities need to push for a renewed American openness. In the 1980s, Hewlett-Packard chief Jack Young spurred his colleagues to form the U.S. Council on Competitiveness, which did much to bring the country's lagging industrial competitiveness to public attention. The private sector can similarly take the lead now by establishing a Global Creativity Commission—a coalition of world political and business leaders committed to developing strategies to ensure that global talent can move efficiently across borders.

Invest generously in research and education. Corporate RD funding dropped by nearly \$ 8 billion in 2002—the largest single-year decline since the 1950s, the National Science Foundation reports. And right now, the federal government is cutting key areas of defense RD spending. Many state governments have slashed higher education funding for arts and culture while pumping millions into stadiums, convention centers, and other bricks-and-mortar projects. Never mind that the local economic benefits of such projects often dry up the minute the last construction worker drives off the site. These choices signal a profound failure to understand what's required to maintain an atmosphere of innovation.

The United States must invest generously in its creative infrastructure. Education reform must, at its core, make schools into places that cultivate creativity. Americans revel in the legendary stories of young creators like Michael Dell building new businesses in dorm rooms or in garages in their spare time. The question is: Why are they doing these things in their spare time? Isn't this the real stuff of education in the Creative Age?

What's needed is the equivalent of a GI Bill for creativity. The nation must spend radically more on research and development and on higher education, opening up universities and colleges to more Americans and to more of the world's best and brightest. In the same way it built the canals, railroads, and highways to power industrial growth, the United States has to build the creative infrastructure for the future.

Here again, business and academia may need to take the lead, at least in the short run. In response to the recent restrictions on federal funding for stem cell research, Lawrence Summers announced plans earlier this year to launch a multimillion-dollar Harvard Stem Cell Institute. Says George Q. Daley, an associate professor at Harvard Medical School and Children's Hospital, "Harvard has the resources, Harvard has the breadth, and, frankly, Harvard has the responsibility to take up the slack that the government is leaving."

Tap into more people's creative capabilities. If the creative class in America accounts for less than a third of the workforce, then, of course, the vast majority is not part of it. Nearly 45% of the U.S. workforce falls into the service class, for instance—janitors, low-end health care workers, office clerks, food service workers, and the like. Members of this class earn, on average, less than half of what creative-class members do—around \$ 22,000 a year versus more than \$ 50,000.

Employing so many citizens in noncreative ways is a terrible waste of talent and potential. So far, the U.S. has gotten away with it because few other societies do much better. But remember what happened in the 1970s and 1980s, when Japanese auto companies leaped to global prominence with manufacturing methods that tapped the intelligence of every worker on the factory floor to make continuous improvements in quality and productivity. U.S. manufacturers—stuck in the old Taylorist model, in which the engineers made the decisions and the laborers simply carried out the rote work—nearly had their doors blown off. If other nations develop better ways to harness their societies' creativity, the U.S. economy might be blown away on an inconceivable scale.

The United States needs to substantially upgrade the pay, working conditions, and status of the huge number of service jobs its economy is generating. These are the port-of-entry jobs to the creative

economy of today. During the Great Depression and the New Deal, the nation succeeded in turning a large number of formerly low-skill, low-pay, blue-collar jobs into the kind of occupations that could support families and become the launchpad for upward mobility. And many of the equivalent jobs today-hairdressing, massage therapy, and aestheticians, to name only a few-are virtually impervious to outsourcing.

Addressing the needs of the American creative class will be important, but it won't be enough. To prevent widespread social unrest and to benefit economically from the creative input of the maximum number of its citizens, the United States will have to find ways to bring the service and manufacturing sectors more fully into the Creative Age.

The Future of Global Creativity

Maybe I'm an eternal optimist, but I think the United States can continue to be a beacon of openness for the creative class-and, indeed, for the whole of humanity. It has a long history of resourcefulness and creativity to draw on, and it has transformed itself many times before, rebuilding after the Great Depression and bouncing back after the Asian manufacturing boom of the 1980s.

Unfortunately, America's eroding access to high-level foreign talent hasn't drawn much attention from political leaders or from the media. They have seemingly bigger and more immediate problems-from the war on terrorism to the loss of manufacturing jobs to China, India, and Mexico. But the nation is overlooking the biggest threat to its economic well-being-just as it did when its obsession with the Soviet Union in the last years of the Cold War caused it to miss the economic challenge of Japan.

The role of the United States in generating creativity and human capital is a concern not only for U.S. businesses and policy makers but for all nations. American universities and corporations have long been the educators and innovators for the world. If this engine stalls-or if political decisions about immigration, visas, and scientific research put sugar in its gas tank-the whole world will have to live with the repercussions.

The Creative Age requires nothing short of a change of worldview. Creativity is not a tangible asset like mineral deposits, something that can be hoarded or fought over, or even bought and sold. The U.S. must begin to think of creativity as a "common good," like liberty or security. It is something essential that belongs to everyone and must always be nourished, renewed, and maintained-or else it will slip away.

Creative Regions

Competition for talent occurs not only between nations but also between cities and regions, just as competition in many industries occurs at the business-unit, rather than the company, level. New York, for instance, is pitted against London and Hong Kong; San Francisco is up against the likes of Dublin, Vancouver, Stockholm, and Sydney. While comprehensive regional data do not exist, several studies do give a detailed picture of areas inside Canada and Australia.

According to data amassed by Kevin Stolarick, Meric Gertler, Gary Gates, and Tara Vinodrai, the percentage of workers in the creative classes in Toronto (36.4%), Montreal (35.0%), and Vancouver (35.2%) rival those in the leading American regions. Of America's ten most populous regions, only the Washington, DC (39.8%), and Boston (36.5%) areas do better. Toronto and Vancouver have the highest concentration of immigrants in North America, with 43.7% and 37.5% of their respective populations hailing from other countries. By comparison only 24.4% of New Yorkers were born outside the United States and only 30.9% of Los Angelenos. Of course, percentages don't give the full picture. The sheer number of creative-class members found in a metropolis like New York is far

greater than in, say, Toronto. But the percentages do shed light on which cities are fostering creative cultures and will, therefore, be attractive to more creative types in the future.

Australia's leading regions are also well poised to compete as global creative centers, according to detailed benchmarking data compiled by the National Institute of Economic and Industry Research. Its two largest regions, Sydney and Melbourne, would rank approximately fourth or fifth if they were U.S. regions. Their creative classes are similar in size to those of Boston or Seattle. The Australian study compiled data for particular inner-city neighborhoods, as well. Creative occupations make up fully half the workforce in both central Sydney (51.1%) and central Melbourne (49.5%)-far greater than in virtually any inner city in the U.S. Both of these centers have high percentages of immigrants-42.5% and 35.6% respectively-and are hotbeds of fine art, fashion, music, and street culture.

These and many other cities outside the United States boast additional attractions-stunning natural landscapes, world-class beaches, extensive recreational enticements. An added plus: They're rarely at war with anyone. These cities are fast becoming the global equivalents of Austin, Texas-transforming themselves from small, relatively obscure outposts into creative centers capable of luring talent from around the world.