

**U.S. HOUSE OF REPRESENTATIVES  
COMMITTEE ON SCIENCE AND TECHNOLOGY**

**HEARING CHARTER**

*The Globalization of R&D and Innovation, Pt. II: The University Response*

**Thursday, July 26, 2007**

**10:00 a.m. - 12:00 p.m.**

**2318 Rayburn House Office Building**

**1. Purpose**

On Thursday, July 26, 2007, the Committee on Science and Technology will hold a hearing to consider how globalization affects America's universities, and its implications for the U.S. science and engineering enterprise. The U.S. higher education system is a principal source of America's preeminence in science, technology, engineering, and mathematics (STEM) fields. As STEM offshoring increases competition for U.S. STEM workers, universities are responding by modifying their curricula to help their STEM students better compete. Globalization also enables American universities to venture abroad—to build programs and campuses overseas to serve the growing demand of foreign STEM students. This hearing will explore the globalization and internationalization of American universities and the implications for America's competitiveness.

**2. Witnesses**

**Dr. David J. Skorton** is president of Cornell University.

**Dr. Gary Schuster** is provost and vice president for academic affairs of Georgia Institute of Technology.

**Mr. Mark Wessel** is dean of the H. John Heinz III School of Public Policy and Management at Carnegie Mellon University.

**Dr. Philip Altbach** is the Director of the Center for International Higher Education and the J. Donald Monan SJ Professor of Higher Education at Boston College.

**3. Brief Overview**

- Enrollments in some STEM fields, particularly computer sciences, are down significantly over the past few years in part because students believe these jobs are vulnerable to offshoring. In response, universities are modifying STEM curricula in order to give their students an advantage over emerging competitors from low-cost countries. Some curricular strategies include: substituting technical classes with business ones; offering interdisciplinary technical degree programs such as bio-engineering with electrical engineering; and, providing international exposure to technical students such as study abroad, foreign language trainings, and collaborative projects with students in other countries.

- According to the American Council on Education (ACE) approximately one percent of American students participate in study abroad programs. For engineering students the number is even smaller, so some engineering colleges are encouraging more of their students to participate in international experiences. Rensselaer Polytechnic Institute (RPI) has set a goal to send 25 percent of its 2010 class overseas through partnerships with universities around the world.
- America's higher education is considered the best in the world. *The Economist* reports that America has seventeen of the top twenty universities and employs 70 percent of the world's Nobel prize-winners. American academics also produce 30 percent of the world's peer-reviewed scientific and technical journal articles, according to the National Science Foundation's (NSF) *Science and Engineering Indicators 2006*.
- American universities have traditionally attracted large numbers of foreign students, particularly advanced degree STEM students. Now, some American universities are taking their education to foreign students by building campuses and offering STEM degree programs in other countries. While there are no definitive counts of foreign campuses and programs established by American universities, experts believe that more universities, particularly high-prestige ones, are venturing abroad. The World Bank estimates that 150 of the 700 foreign degree programs operating in China are American.
- The American Council on Education (ACE) identifies eight different drivers of the internationalization of American universities, including: increasing revenue, enhancing prestige, enhancing international research collaborations, serving rapidly growing demand from China and India, and enhancing study abroad opportunities for U.S. students.

#### 4. Issues and Concerns

**What factors lead universities to establish branch campuses overseas and how widespread is this trend? What are the benefits and costs of this trend to the U.S. national interest in maintaining an edge in international economic competitiveness - and to overall U.S. national interests?**

Experts predict that the number of foreign campuses and degree programs operated by American universities will increase significantly in the near future. The goals of these operations include increasing revenue, enhancing prestige, serving rapidly growing demand from China and India, and enhancing study abroad opportunities for U.S. students. The World Bank estimates that 150 of the 700 foreign degree programs in China are from American universities.

**Do STEM educational programs offered at foreign campuses slow down or speed up the offshoring of STEM jobs? Are we exporting one of the principal sources of our comparative advantage? Are we training American workers' competitors?**

The burgeoning demand for quality STEM education in India and China is driven in part by the rise of offshoring technology work to India and manufacturing work to China.

**As U.S. STEM workers increasingly compete directly with workers based in low-cost countries, much of their competitive advantage will come from superior education. Have U.S. universities made curricular changes to give U.S. STEM students a durable advantage? Are the changes common across most U.S. universities and are they effective?**

Some STEM programs are substituting technical classes like computer science with business classes such as project management. Other programs are combining technical disciplines like biomedical engineering with electrical engineering to create interdisciplinary graduates.

### **How do foreign educational programs and campuses affect the flow of foreign graduate students to American universities?**

If foreign students are able to get the same degree in their home countries for less money, they may forgo studying in the U.S. On the other hand, foreign campuses may expand the pool of students seeking graduate degrees in the U.S.

## **5. Background**

The U.S. higher education system is a principal source of America's pre-eminence in science, technology, engineering, and mathematics (STEM) fields. The *Economist* reports that America's higher education is the best in the world, home to seventeen of the top twenty universities and 70 percent of the world's Nobel prize-winners. The National Science Board reports that American academics produce 30 percent of the world's science and engineering articles. But globalization is reshaping how and where STEM work is done, and American universities are adapting to globalization and offshoring by internationalizing STEM curricula and by increasing their global footprint.

American STEM students face increased competition and career vulnerability in the wake of offshoring and globalization. As a result, U.S. students are shying away from STEM fields they deem vulnerable to offshoring. The most prominent example is computer science, where undergraduate enrollments are down 40 percent over the past four years. Universities are responding to those concerns by modifying their STEM curricula and offering more international exposure for their U.S. students.

To make their students more desirable in the job market, engineering colleges are providing more international experience for them. Currently, engineering students participate in study abroad programs in disproportionately small numbers, so a number of engineering colleges have set goals to increase these numbers. About half of Worcester Polytechnic Institute's (WPI) graduating class goes overseas in some capacity. And through partnerships with universities around the world, RPI has set a goal to have 25 percent of its 2010 class study or travel abroad. Other universities, like the University of Rhode Island, are approaching internationalization of STEM education by emphasizing foreign language training. Still others, like Purdue University, match up its students with students in other countries on international design teams.

American universities are also seeking to increase their global presence by venturing abroad – building campuses and STEM degree programs overseas. American universities have traditionally attracted large numbers of foreign students, particularly in STEM fields at the graduate level. Now, American universities are taking their education to foreign students by building campuses and offering STEM degree programs in other countries. Some, like Cornell, already identify themselves as “transnational universities.”

As part of its strategic plan to increase its global footprint Carnegie-Mellon has established programs in Greece, Japan, Taiwan, South Korea, Australia and India. Georgia Tech is building a campus in Andhra Pradesh, India, to offer Master's and Ph.D. degree programs. And Cornell University operates a medical school in Qatar.

Offshoring is giving high quality foreign students job opportunities in their home countries they never had before, making it less desirable to come to the U.S. to study. As a result prominent universities are expanding their global footprints, to tap a more geographically diffuse student pool especially in India and China.

While there are no definitive counts of foreign campuses and programs established by American universities, experts believe that more universities, particularly high-prestige ones, are venturing abroad. And the World Bank estimates that 150 of the 700 foreign degree programs operating in China are American. ACE identifies eight different drivers of the internationalization of American universities. Some of these include: increasing revenue, enhancing prestige, enhancing international research collaborations, exponential growth in demand in emerging economies of China and India, and enhancing study abroad opportunities for U.S. students.

The hearing will explore the trends, motivations, and consequences of the globalization of American universities on the U.S. science and engineering enterprise.