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Visa Woes Adversely Affect Physical Science Departments, Industry

A survey by the American Institute of Physics (AIP) has found that while the number of applications to U.S. colleges and universities from international students remains relatively stable, these numbers are not reflected in actual attendance. Two-thirds of PhD-granting physics departments and nearly half of master's degree departments reported that they had accepted non-U.S. students who were subsequently unable to attend because of visa difficulties. The findings, detailed in the report "Physics Students from Abroad in the Post-9/11 Era," released in July, indicate potentially serious repercussions to the U.S. research enterprise if the visa approval process is not streamlined.

AIP's Statistical Research Center undertook the survey last fall after hearing repeated tales of visa difficulties following the September 11, 2001, terrorist attacks, and other recent surveys of student enrollments showed decreases in two consecutive years in the number of non-U.S. citizens among matriculating physics students. Last fall, the Federation of Materials Societies conducted an informal survey through its affiliate, the University Materials Council (UMC)—comprised of the heads of materials science and engineering departments in the United States and Canada—to determine the impact of denied visas on enrollment, but the results were largely anecdotal and hence inconclusive. The AIP study is the first to provide some solid statistical data.

Those data are not encouraging. AIP's analysts found that approximately 20% of non-U.S. students admitted to physics graduate programs in the United States were prevented (at least initially) from attending because of visa problems. The report also found that "many departments report major effects on course enrollments and on their ability to fill openings" for research and teaching assistants. The impact is strongest on small departments because they have fewer resources and less flexibility to compensate when faced with sudden no-shows. "This has severely impacted our graduate program, as we will have fewer students available to perform research in our nationally funded programs," one university reported in the survey. "Also, this lack of graduate students has had a negative impact [because] the university is considering a reduction in the budget of the departments with decreasing graduate student enrollments."

Visa difficulties are also adversely affecting open scientific exchange, a cornerstone of the international research enterprise. The American Physical Society

(APS) is greatly concerned about the impact of visa restrictions on attendance at its upcoming 2004 March Meeting in Montreal, Canada. According to Slade Cargill of Lehigh University, who serves on the APS Council and also chairs the UMC, the situation depends on the type of visa held, specifically, whether it allows multiple reentry into the country. "We're advising caution," he said, referring to non-U.S. students and researchers planning on attending the meeting. The APS has set up an informational Web site to answer questions and address difficulties. The National Academies has also set up a Web site providing information for visiting scientists and scholars, including a questionnaire through which individuals can report difficulties with the visa process (<http://www7.national-academies.org/visas>).

Even industry is struggling. Darrel Frear, manager of Motorola's Semiconductor Product Systems, reports that it took one non-U.S. employee a year and a half to get his work permit even before 9/11, and the problem has only worsened. "The amount of bureaucratic red tape is tremendous," he said. "We can't hire enough U.S. graduates of high technical quality, and now we're having problems hiring foreign graduates. I think everyone realizes we have to protect our national security, but the visa process needs to be streamlined."

To date, most of the State Department's actions have accomplished just the opposite. For instance, a new review program called Condor has been implemented, which flags "nationals of certain countries of concern" for additional security reviews. The Homeland Security Act called for a biometric identifier, such as a fingerprint, on all passports by October 2004; that requirement has since been fast-tracked for January 1, 2004.

A further complication is that authority for issuing visas, once solely the purview of the State Department, is now split between that agency and the new Department for Homeland Security, which now houses the Immigration and Naturalization Service (INS). And the State Department has expanded its technology alert list—technical words or phrases that can trigger a more thorough "Mantis" review—to encompass everything from nuclear engineering and chemistry to biotechnology and urban planning. Materials-related triggers include advanced metals and alloys, nanocomposite ceramic materials, ceramics, dentification, organo-metals, liquid and solid lubricants, superconductive polymers, and polymeric materials.

The State Department claims that about 90% of visas flagged for containing

words on the technology alert list are processed within 30 days, but a May 3 cable announced new guidelines that will most likely change that. Effective August 1, 2003, every visa applicant from all but a handful of countries is required to undergo a personal interview, adding greatly to an already long line of backlogged interviewees. The May 16, 2003, edition of the *Wall Street Journal* quoted a State Department spokesperson saying that the new requirements would increase the number of interviews from around 50% to 90%, with no corresponding increase in resources.

"Students, faculty, and researchers were always required to have a face-to-face interview, that's not the issue," said Barry Toiv, a spokesperson for the Association of American Universities (AAU), which has taken a leading role in organizing numerous scientific societies in a collaborative effort to ameliorate the situation. "The problem is that this will greatly increase the workload of the consulates without providing additional resources."

Over the course of the summer, the AAU sent a series of letters to U.S. Secretary of State Colin Powell and the chairs of key House committees, expressing concern about the new policies on behalf of the scientific community. "We fear a chilling academic and scientific environment has begun to emerge for foreign students, scholars, and scientists, and if current problems and delays in the U.S. visa system are not addressed swiftly and effectively, our nation may lose some of the world's best and brightest scientists to other countries," a July 23 letter to Rep. Tom Davis (R-Va.), chair of the House Committee on Government Reform, stated. "Such losses could prove devastating to our nation's higher education system."

Toiv reported some recent progress. The State Department sent out a communication to consulates in July asking them to give priority in the interview process to students, researchers, and faculty so that they can enter the country in time for the fall semester. And representatives have been placed at various border points and ports to deal with visa-related difficulties as they arise. The AAU is also lobbying Congress to provide additional funds for implementing the stricter interview process.

"We fully recognize the need for security in the post-9/11 environment," said Toiv. "But international students and faculty play a major role in the U.S. research enterprise, so it's important that we maintain to the highest degree possible the flow of students, researchers, and scholars from abroad."

JENNIFER OUELLETTE

Status of Hydrogen Storage Materials Assessed in Japan's NISTEP S&T Trends Report

The National Institute of Science and Technology Policy (NISTEP) of the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) in Japan has released its quarterly (July 2003) review of "Science and Technology Trends." In the area of nanotechnology and materials—one of the four priority fields established in Japan's Second Science and Technology Basic Plan (fiscal years 2001–2005)—the report focuses on research trends in hydrogen storage materials as a key technology for fuel-cell-powered vehicles.

NISTEP raised a concern that since fuel-cell-powered vehicles are a reality, the pace of research must be increased to develop hydrogen storage materials with higher performance than is currently available and that an international standard should be established. In 2002, the Japanese government purchased automobiles equipped with hydrogen fuel cells and established hydrogen supply stations. This year, Iceland, through the Ecological City Transport System (ECTOS) project, and seven countries in Europe, through the Clean Urban Transport for Europe (CUTE) project, plan to introduce 30 hydrogen fuel-cell-powered buses in 10 cities.

Research in fuel-cell-powered vehicles still needs to be funded in order to achieve cruising distances comparable to gas-powered cars. Japan's New Energy and Industrial Technology Development Organization (NEDO), under the Ministry of Economy, Trade, and Industry (METI), administers the World Energy Network (WE-NET) that carries out hydrogen storage research. WE-NET's latest goal for materials is to achieve 5.5 wt% hydrogen

storage, and the goal of the U.S. Department of Energy is 6.5 wt%.

NISTEP noted that as hydrogen fuel cells are developed, along with accompanying technologies such as dispensers and hydrogen supplying connectors, international regulations and standards (including standard pressures) will be established for hydrogen fuel-cell-powered vehicles; the institute cautioned that these standards should be set through international cooperation.

Research in hydrogen storage materials is not only being conducted for the automotive industry, but is also being considered for energy security and as a replacement for fossil fuels in non-automotive areas. NISTEP concluded that "governments must play an important role to coordinate multiple projects related to hydrogen energy and bring forth the overall effects."

The quarterly review, published by NISTEP's Science and Technology Foresight Center, can be accessed at Web site www.nistep.go.jp.

India to Establish National Hydrogen Energy Board

India's Ministry of Nonconventional Energy Sources (MNES) proposes to set up a National Hydrogen Energy Board for developing a national hydrogen energy road map. The board will be headed by the minister, and members of the board will be drawn from various other agencies, Indian Institutes of Technology, scientific organizations, and industry associations. Eminent scientists and members representing leading organizations connected with this field will also be members of the board. M. Kannappan, minister of state for MNES, said the two

major areas of focus in the new technology programs are (1) alternate fuels for transportation (e.g., electric vehicles, fuel cells, and hydrogen energy) and (2) decentralized production of power, comprising bio-fuels, hydrogen energy, fuel cells, geothermal energy, and tidal energy. With MNES support, innovative materials and techniques have been developed and demonstrated for storing hydrogen, especially for two-wheeled transportation applications, power-generating units, and catalytic burners for domestic and industrial use.

Forum to Examine Development of Nanotechnologies and Nanosciences in Europe

The Industrial Technologies Directorate of the European Commission's Research Directorate-General is organizing EuroNanoForum2003 in Trieste, Italy, December 9–12, 2003, to encourage expansion of nanotechnologies in Europe. EuroNanoForum2003 will examine the present situation in the development of nanosciences and nanotechnologies in Europe in the context of the European Research Area, the forthcoming enlargement of the European Union, the international dimension, and the integrating character of the Sixth Framework Programme. The event will provide key players and specialists in public administration, research, education, industry, banking, financing, social sciences, and the media with the occasion to exchange views and discuss the current state of nanotechnology development. The forum will be sponsored by the government of the Friuli Venezia Giulia region of Italy.

Participants will be asked to consider and identify potential bottlenecks in the expansion and reinforcement of nanosciences in general and in the formulation, development, application, and use of nanotechnology-based products and services in particular. The state of the art in a number of representative and interdisciplinary technical areas—such as nano-manufacturing and instrumentation, functional materials, ambient intelligence, nanoelectronics, health and medicine, energy, nanorobots and nanoelectromechanical systems, and optics and photonics—will be discussed and the potential applications and possible risks associated to the new technologies analyzed. Information can be accessed at Web site www.euronanoforum2003.org. □

Office of Basic Energy Sciences Seeks New Division Directors

The Office of Basic Energy Sciences (BES) within the U.S. Department of Energy's (DOE's) Office of Science has recently undergone a reorganization to form two divisions from its existing Materials Sciences and Engineering Division. DOE will be appointing a new director for the Materials Sciences and Engineering Division and a director for the newly established Scientific User Facilities Division.

The Materials Sciences and Engineering Division sponsors basic research to understand the atomistic basis of materials properties and behavior and how to make materials perform better at acceptable cost through new methods of synthesis and processing. DOE is now seeking candidates for the division director. Candidates must apply on line, and include a resume and address each of the Executive Core Qualifications and Technical Qualifications. The position is posted online under Vacancy Announcement Number ETR-03-ES-024(PN). Information on how to apply may be found at Web site <http://chris.inel.gov/jobs/index.cfm?FuseAction=viewJobDescription&ID=15808&public=true>.

FOR SCIENCE POLICY AFFECTING MATERIALS RESEARCH . . .

. . . access the Materials Research Society Web site:

www.mrs.org/pa/