Careers in homeland security:

by Elka Jones

"What's the worst that could happen?" For security consultant Dave Gilmore, that's a serious question.

"It's a challenging field," he says of homeland security. "You're trying to find out the types of problems you're dealing with and how to solve these problems in advance. Typically, you have plans to deal with the more likely problems, but you can't prepare for every eventuality. You also need to be able to react." Gilmore is one of many workers who help to keep this country—and its citizens—safe.

Homeland security is a dynamic and diverse career field. Like security threats themselves, the work required to protect the Nation is constantly changing. That work cuts across numerous disciplines, creating job possibilities for people with nearly any level of education and experience. Options exist both for those who like to be in the forefront and for those who prefer to work in the background.

Many jobs, one mission

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This article describes homeland security careers. The first section discusses the range of employment opportunities—highlighting places of employment and general types of work. The second section provides a glimpse into what it might be like to work in homeland security by focusing on three specific occupations: Border Patrol agents, emergency management directors, and analytical chemists. The third section suggests ways to find more information.

Homeland security work

People who work in homeland security anticipate, prepare for, prevent, and react to everything from pandemics to hurricanes to terrorism. These workers help to reduce our Nation's vulnerabilities and to minimize the damage from catastrophic events.

Due to the nature of their work, those involved with homeland security might have to meet certain criteria not generally required of other workers.

For example, many applicants for homeland security jobs must undergo security clearances or background checks. Maria Soriano, a nurse who works for the U.S. Department of Homeland Security, explains that workers need security clearances because of the sensitive information with which they may come into contact. "Every single employee who walks through the doors here needs a security clearance," she says, "which includes a pretty thorough background investigation." Applicants should understand that this can mean a longer waiting period before being offered a job.

Another common requirement for homeland security employment is that applicants be U.S. citizens. But beyond these basic parameters, opportunities exist for people of varying interests, skills, and backgrounds.

Varied employers

Homeland security work is available in the air, on land, and at sea. There are jobs in every State, in the District of

Elka Jones is a contributing editor to the OOQ*, (202) 691-5719.*

Columbia, and abroad.

Many homeland security jobs are with State, Federal, or local governments. But there are plenty of other opportunities in private companies and nonprofit organizations. "I'd say there's not an industry or business out there today that's not impacted by homeland security," says Rich Cooper, business liaison director at the U.S. Department of Homeland Security.

U.S. Department of Homeland Security. In 2001, the U.S. Department of Homeland Security was created to promote homeland security and to coordinate homeland security efforts among other government agencies and private industry.

With multiple locations in and around Washington, D.C., and throughout the country, the Department of Homeland Security employed about 183,000 workers in April 2006—making it one of the largest Federal agencies.

Jobs at the Homeland Security Department are many and varied. They include air marshals, program analysts, and Coast Guard officers, to name a few. (For a list of some Department of Homeland Security occupations, see the box on page 5.)

Along with these Federal positions, the Department also has a significant number of contractor positions. For example, the workers who administer physical examinations for its agents and officers are often employed by contract firms. And the Department's efforts are supported by advisory councils, national laboratories, and research and development centers.

Other Federal agencies. Many other Federal workers have responsibilities related to securing the Nation. Workers at the Central Intelligence Agency and elsewhere, for example, help to identify potential threats. The U.S. Department of Labor sends inspectors to ensure that fire fighters and others who might be exposed to hazardous conditions wear sufficiently protective gear. And the U.S. Department of State's Bureau of Diplomatic Security has special agents who advise U.S. ambassadors in foreign countries and protect foreign dignitaries in the United States.

State and local governments. State and local governments also employ large numbers of people who do homeland security work. For example, many of the Nation's first responders—emergency medical technicians, paramedics, fire fighters, police, and other workers who arrive at the scene of a threat or incident—are State and local government employees. Public buildings and facilities—such as municipal waterworks—often need workers to handle safety and security-related issues. And all States, as well as many cities and counties, have an emergency management agency or similar organization to coordinate crisis services and look at ways to ensure homeland security at the State and local levels.

Private industry and nonprofits. Businesses—both for-profit and not-for-profit—also do homeland security work.

Security is one of the biggest areas of private sector employment. Many companies hire security workers to protect against possible threats to employees, customers, and physical and electronic assets. Corporations also rely on workers to develop contingency plans detailing how to handle possible disruptions to their business. Moreover, some businesses employ workers who develop and sell products and services related to homeland security.

Nonprofit organizations are another source of homeland security employment. A nonprofit environmental organization, for example, might examine the best ways to clean up a site that has been contaminated by a chemical or biological agent. And educational institutions employ people who teach and conduct research on a number of issues related to homeland security.

Varied careers

Defined expansively, a homeland security occupation might include any job in which workers help to keep people and places in this country safe. Meteorologists, for example, save U.S. lives by predicting and warning of hazardous weather conditions. Architects and engineers ensure the preservation of buildings and other key infrastructure by designing structures that can withstand natural or human-caused disasters. And doctors keep Americans healthy, prevent the spread of disease, and diagnose and treat patients who are ill or injured.

Even occupations that seem to have little to do with protecting the country can relate to homeland security. Security agencies and organizations employ accountants, administrative assistants, human resources managers, and others, all of whose efforts support homeland security's objectives.

"In terms of careers, homeland security has an impact in so many ways," says Homeland Security's Cooper. It's everything from an airport screener to an intelligence analyst to a person who looks at infrastructure and how

U.S. Department of Homeland Security, selected occupations

This box shows some of the occupations found within the U.S. Department of Homeland Security. The list is not all-inclusive; there are many other occupations in the Department.

Moreover, just because an occupation is listed under a particular Division of the Department does not mean that the occupation exists only in that Division. For example, criminal investigators are employed not only in the Transportation Security Administration and the U.S. Secret Service, as shown below, but also in the Immigration and Customs Enforcement Division and in the Office of the Inspector General. Similarly, although engineers are only listed under the Science and Technology Directorate and the U.S. Coast Guard, engineers are also employed by the Information Analysis and Infrastructure Protection Directorate and the Federal Emergency Management Agency.

Citizenship and Immigration Services
Asylum officer
Immigration officer

Customs and Border Protection
Border Patrol agent
Import specialist

Federal Emergency Management Agency
Federal coordinating officer
Program specialist (fire; national security; response, recovery, preparedness, and mitigation)

Federal Law Enforcement Training Center
Law enforcement specialist (instruction)

Immigration and Customs Enforcement
Detention and deportation officer
Police officer
Immigration enforcement agent
Security specialist

Information Analysis and Infrastructure Protection Directorate
Protective security advisor
Intelligence operations specialist
IT specialist (information security)
Security specialist
Telecommunications specialist

Office of the Inspector General
Attorney
Auditor

Science and Technology Directorate
Biological scientist
Chemist
Computer scientist
Engineer
Physicist

Secretarial Offices
Human resources specialist
Policy analyst

Transportation and Security Administration
Criminal investigator
Intelligence operations specialist
Program and management analyst
Transportation security screener

U.S. Coast Guard
Contract specialist
Engineer

U.S. Secret Service
Criminal investigator

we can ready it. It's such a broad panorama." This panorama includes the career areas that follow.

Business continuity. "How do you get businesses up and running again after a catastrophe like Hurricane Katrina has occurred?" asks Cooper. "How do you keep critical infrastructure going?"

The people who provide answers to these questions help to ensure business continuity, and Cooper says that this is one area with potential for huge employment growth. Workers dealing with these issues might have job titles such as business continuity expert or emergency operations director.

Emergency management. Emergency management specialists can have different job titles and duties. But all of these workers are involved in mitigation, preparedness, response, or recovery activities. Their efforts are critical to homeland security because they help people, businesses, and communities to avoid and better react to crises.

"We have so many things that we do," says Deborah Wing, a public affairs officer at the Federal Emergency Management Agency (FEMA). "We have people who work in call centers taking emergency calls, those who do search and rescue, mitigation specialists," she says, naming a few occupational examples.

See pages 10-13 for detailed information about the emergency management-related occupation of emergency management directors.

Information security. Workers in information security protect all types of information—both recorded on paper and stored digitally—and the systems that move this information. "These workers are generalists, but they also understand computer science," says Alan Berg, director of the Information Assurance and Infrastructure Protection program at Towson University.

Understanding computer science is important because much of what these workers protect does not exist in tangible form. "Information security specialists focus on protecting information in the abstract," says John Hale, associate professor of computer science and director of the Center for Information Security at the University of Tulsa.

These specialists make sure that important information gets to the right place and doesn't get into the wrong hands. For example, says Berg, "You have an expectation that when you send an e-mail, the person you're sending it to will receive it. Someone out there is ensuring that this happens. The country needs more of these workers."

Infrastructure protection. Infrastructure protection workers identify ways to safeguard communities' basic functions—including communication, utility, transportation, financial, and public health systems. This requires understanding how these systems work and how they can be made less vulnerable, developing plans to identify and deal with possible threats, and being able to restore these systems' ability to function during and after a crisis.

Infrastructure protection specialist is an example of a relatively new occupational title that has been created in this area, says Joe Coffee, executive director of the National Partnership for Careers in Law, Public Safety, Corrections, and Security. Most of the country's critical infrastructure is owned and operated—and thus protected—by the private sector, although jobs for workers who protect infrastructure can be found in nearly all sectors.

Intelligence analysis. Intelligence analysts interpret information from a variety of sources. By filtering through and piecing together data, these workers can uncover possible clues to help solve or prevent homeland security-related crimes.

Intelligence Analyst Steve Hunter says that the intelligence community as a whole has grown; other experts suggest that intelligence agencies now devote more time to homeland security-related issues. A new entity, the U.S. Department of Homeland Security's Terrorist Threat Integration Center, helps to coordinate intelligence data in one place.

Law enforcement. Law enforcement workers make the country safer by deterring and investigating crimes.

Police officers, as part of one of the largest law enforcement occupations, promote homeland security by patrolling areas, enforcing laws, maintaining order, and apprehending and arresting people suspected of criminal activity. Special agents who investigate crimes that include terrorist-related incidents or threats are also at the forefront of homeland security.

Today, more than 80 Federal organizations employ law enforcement agents and officers, says Peggy Dixon, a public affairs officer at the Federal Law Enforcement Training Center in Glynco, Georgia. State and local governments also employ many law enforcement workers.

See pages 8-10 for detailed information about the

Border Patrol agents do office work in addition to spending time outside.

law enforcement-related occupation of Border Patrol agent.

Physical security. Many places throughout the country are now being made more secure. As a result, new opportunities for physical security workers have popped up everywhere from seaports to shopping centers.

Christine Smith, a career development program analyst at the Transportation Security Administration, points out that airport security jobs are among those that have experienced considerable growth since September 11, 2001. For example, Federal employment of airport screeners, now called transportation security officers, numbered more than 49,200 in March 2005, a significant increase over the occupation's pre-September 11, 2001, non-Federal employment levels.

"And it's not just the security officers that you would see, say, at the airport or in a mall," says Gilmore. Hotels, healthcare facilities, and almost any business of substantial size, he says, have security personnel working behind the scenes. Many of these workers consider physical security in a broad sense: by developing security awareness classes for employees, for example, or by conducting risk analyses of facilities.

Scientific study. Scientists in homeland security use knowledge of physics, chemistry, biology, and other sciences to reduce the risks from naturally occurring threats and weapons of mass destruction, including chemical, biological, radiological, and nuclear agents. Some scientists, such as epidemiologists, use medical science to study the spread of disease.

Prevention, detection, and mitigation of an outbreak or attack are the primary goals of scientists working in homeland security, says Benn Tannenbaum, a physicist and senior program associate at the Center for Science, Technology, and Security Policy at the American Association for the Advancement of Science. These workers develop and test scientific theories, make observations, and run experiments.

Although many scientists work in a laboratory environment conducting research, not all of them do. "As far as jobs for scientists in homeland security, it depends on what they want to do," says Tannenbaum. "There's this spectrum from pure policy to pure research." Scientists who do policy work answer questions like, "How should U.S. residents prepare for pandemic flu?"

One of the biggest employment areas for scientists in

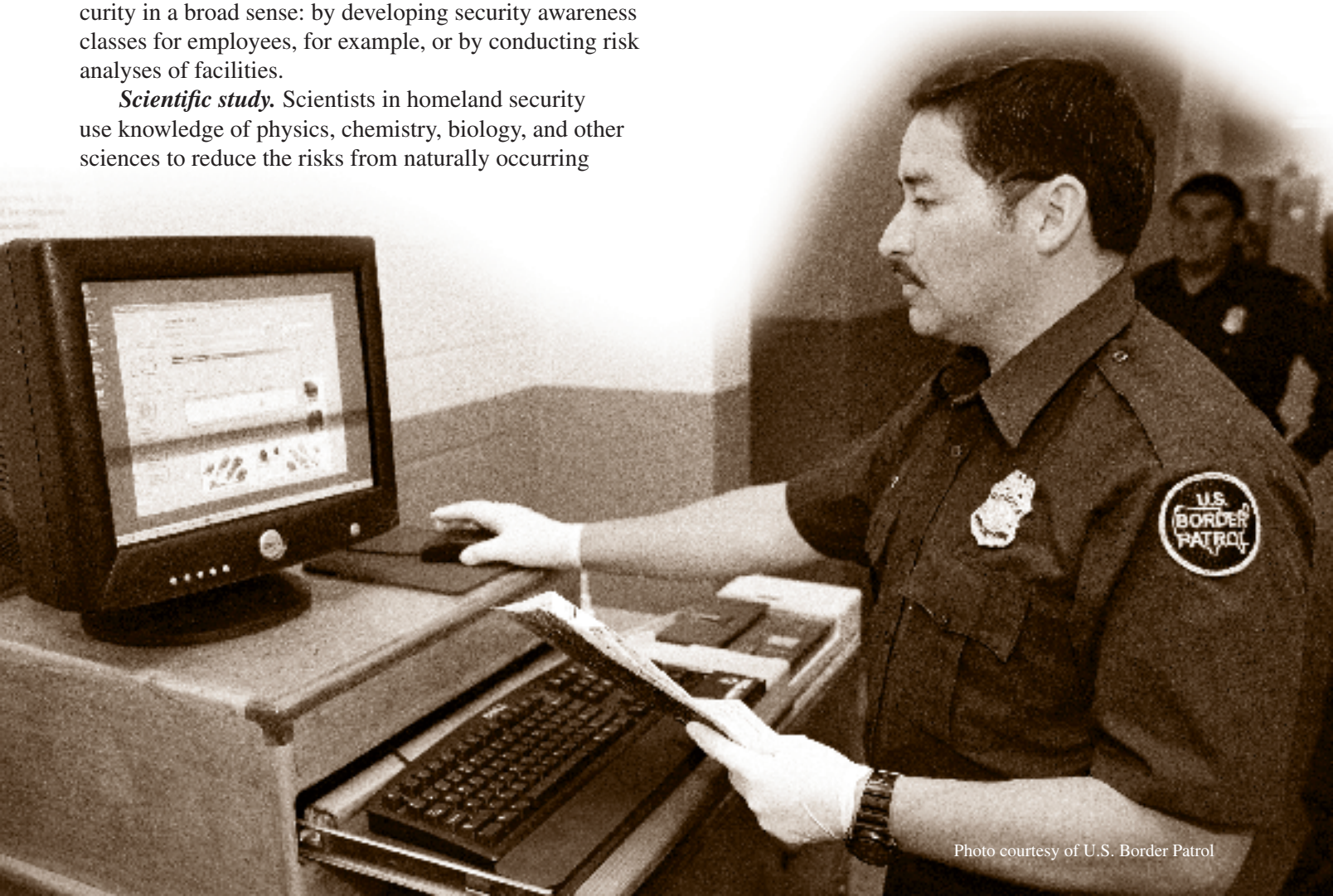

Photo courtesy of U.S. Border Patrol

homeland security is biosecurity, say experts. "The whole area of biodefense and biodefense research is certainly one that is growing," says Marc Wolfson of the Office of Public Health and Emergency Preparedness at the U.S. Department of Health and Human Services.

See pages 13-15 for detailed information about the science-related occupation of analytical chemist.

Other. Many workers in other occupations are also being trained or educated on homeland security issues. Examples include fire fighters, airline pilots, and public transportation crews.

Workers in still other occupations are in high demand. For example, foreign language specialists, particularly those who know Arabic or other Middle Eastern languages, increasingly concentrate their translation efforts on identifying homeland security threats. Geospacial workers are needed to help map out evacuation routes. And cybersecurity specialists have experienced growth in their occupation and in their increased responsibilities for keeping the Nation safe. (See the box on page 9.)

Occupations that secure the homeland

As the previous examples illustrate, new security occupations have emerged, and many existing occupations have evolved to include tasks associated with securing the homeland. Although individual career areas can be identified, there is considerable overlap between the functions performed by these workers.

This section helps to more clearly define the work performed by three types of homeland security workers: Border Patrol agents, emergency management directors, and analytical chemists. Detailed information—about job duties, earnings, and more—highlights their roles.

Border Patrol agents

Border Patrol agents prevent people who don't have a legal right to be in this country from getting in. They also promote homeland security by stopping people from bringing things into the country that shouldn't be here, such as illegal weapons.

Border Patrol agents are stationed along the physical borders of the United States. Agents' jobs differ depending on where they work. "The job that you'll be doing on the southwest border is completely different from the job you'd be doing on the northern border," says Border Patrol Agent Todd Fraser. Like all Border Patrol agents, Fraser started his career in the Southwest, where more people try to enter the country illegally than from any other U.S. border point.

Kenneth St. Germain is a Border Patrol agent in Yuma, Arizona; he patrols alone, often in remote areas. "It's a pretty good amount of desert, sand dunes, and cacti," he says. "And because our area is sand, we chase footprints. It's tracking skills."

St. Germain explains that illegal entrants often try to hide their tracks by putting carpet on their feet or brushing away their footprints with a branch. So even something as small as drops of water might provide clues as to where people have been.

When they apprehend an illegal entrant, Border Patrol agents write down where and when the person was caught, along with his or her personal information such as name and date of birth. They later process the information and check the individual's name and fingerprints against a Federal Bureau of Investigation (FBI) database to see if there is any criminal history.

Illegal entrants don't always travel alone, of course—and apprehending large groups requires a call for backup. "The first time I came across a group of 50 or more was during a very busy season," says Fraser. "It was intense. I felt nervous."

But, says Fraser, you can't let your anxiety get the best of you. "They always look for a weakness," he says, "so it's important to be 'squared away,' which means that your boots are polished, your hair is trimmed. If you have a commanding presence, they'll say, 'I don't want to mess with this guy.'"

Working conditions. Border Patrol agents spend much of their time moving around on patrol. During patrol, agents might use all-terrain vehicles, pickup trucks, bicycles, horses, or boats; they might also patrol on foot or with dogs or be stationed at traffic checkpoints. And like many other law enforcement officers, Border Patrol agents must be comfortable carrying a weapon and wearing a uniform.

Overtime and shift work are common. Most agents work 9 or more hours a day—sometimes as many as 14 hours—with some shifts running throughout the night. In fact, late stints are desired by some agents. "I prefer working the midnight shift," says St. Germain, "because that's when the action is."

But not every day as a Border Patrol agent involves moving around, catching illegal entrants, and being in the

Cybersecurity: Protection from high-tech threats

We might not always realize it, but computers control or manage many aspects of our daily lives. The flow of electricity into our homes and businesses, the transfer of money into and out of our bank accounts, and the detection systems that ensure the safety of our water are all controlled by computers and computer networks.

Few of us fully understand how these complex systems keep our lives running smoothly and safely. Those who do sometimes make a career of protecting us from computer-related threats.

Cybersecurity specialists are the workers who protect the data and systems in networks that are connected to the Internet. But it is no easy task to define who, exactly, these specialists are. In part because of that difficulty, their training requirements vary widely. One thing seems certain, however: Cybersecurity is a growing career field.

Defining workers. "The people who work in computer security have a huge variety of titles, and even people who are doing the same job can't agree on what they should be called," says Ron Kolstad, executive director of the System Administrators Guild. "Their job titles might contain words like computer, database, systems, networking, security, administrator, manager, specialist, or generalist." For example, a systems software engineer, a network administrator, or a chief security officer all might be working in cybersecurity.

One way of categorizing these workers is by the type of things that they protect. Some protect databases of information; others, computer software. Still others protect computer networks, which are groups of two or more computer systems linked together.

Marty Lindner is a computer security expert for the Carnegie Mellon Software Engineering Institute CERT program. He says that cybersecurity employment can be divided into either user jobs or development jobs. On the user side are workers who install, configure, and monitor computer security systems—for example, cybersecurity specialists providing network security help to protect computer networks. On the development side are the workers who build products to ensure and enhance computer security, such as those who write secure and reliable software programs.

Training. Currently, cybersecurity workers' training is as varied as their titles. "As far as education," says Lindner, "it runs the gamut." These specialists don't necessarily need a computer science degree for some jobs. To illustrate, Lindner says that there are people with biology degrees working as computer security specialists. But Kolstad says that they do need some sort of computer background.

Training options have been changing somewhat in recent years as more traditional colleges and universities offer classes or specializations in cybersecurity. But many workers still learn their skills on the job or in classes offered by nondegree-granting organizations. Although some of these organizations are reputable, says Kolstad, future cybersecurity workers should be wary of other ones. "A lot of companies are getting into training to make money," he says, "and they're preying on people's dreams." As they would with any training institution that they plan to attend, would-be students should research an organization's credentials before paying any fees.

Job outlook. The U.S. Bureau of Labor Statistics projects that workers in computer-related fields, especially those in computer security, should have favorable prospects over the 2004-14 decade.

And these workers seem to be needed in almost any business. "Everyone," says Kolstad, "is hiring those security folks."

middle of potentially dangerous encounters. Although Border Patrol agents might spend a considerable amount of time outside, they also do office work, such as typing reports or keeping up-to-date on the laws that impact their jobs. Their work can be both physically and mentally demanding, agents say.

Although prospective agents typically must be willing to work at the location where they're needed most, the job provides an opportunity to travel. Many agents go on "detail" assignments: They work somewhere else, or assume different duties, for a limited time.

Agents often enjoy a temporary change in location. "One of the best things about this career is that I've seen a lot of different places," says Fraser. "You throw your name in a hat, and you get to go to the area for 30 days."

St. Germain ranks job variety high on the list of what he likes about his work. "It's always changing," he says. "My favorite part of the job is that no 2 days are the same. Some are very busy; some are not. But if you thrive in a fast-paced environment—which most of us do—it's a great job."

Employment, outlook, and earnings. In March 2006, there were more than 11,400 Border Patrol agents stationed along U.S. borders, according to the Office of Border Patrol. Although this total includes States such as Florida and New York, most jobs are in California, Arizona, New Mexico, and Texas—the four States that directly neighbor Mexico. The U.S. Bureau of Labor Statistics (BLS) does not collect data or make projections specifically for Border Patrol agents; these workers are included in the broader category of police and sheriff's patrol officers.

Industry sources suggest that the job outlook for Border Patrol agents is good. In part because agents are required to retire at age 57, Fraser estimates that, in addition to growth, a number of positions will open each year as a result of retirements or other attrition. But the job market can be fairly competitive, says Fraser, even though some applicants are discouraged by the occupation's challenges and geographical restrictions.

Earnings for Border Patrol agents are based on the Federal Government's General Schedule (GS) rate. Most agents begin at the GS-5 or GS-7 level, which currently pay about $25,195 or $31,209, respectively, with regular salary increases. Agents are also eligible for administrative overtime, which most reportedly receive.

Preparation. To become a Border Patrol agent, applicants must be U.S. citizens, possess a valid State driver's license, and be younger than 37 years of age.

Other pre-employment requirements include passing a medical examination; a fitness test; a drug test; a panel interview; and a background investigation, an investigation that applicants will fail if they have been convicted of a felony or if they have a history of any kind of physical or spousal abuse. At a minimum, new agents also need a bachelor's degree, 1 year of qualifying experience, or some combination of education and experience. For example, 2 or more years of instruction in a high school Reserve Officer Training Corps (ROTC) program could help to satisfy this requirement, says Border Patrol Agent Maria Valencia.

An understanding of foreign cultures and languages is essential for communicating with people who don't speak English or for whom English is not a first language. Therefore, applicants must either know Spanish or have the willingness and ability to learn it.

Another essential ability for Border Patrol agents is composure. Proof of ability to remain calm under stress is especially important for applicants hoping to qualify based on experience. "The experience doesn't have to be in law enforcement," says Fraser. "It simply has to demonstrate that you're responsible, can be relied on, and can handle stressful situations."

After being recruited, agents receive 20 weeks of paid training in Artesia, New Mexico, followed by further on-the-job training with experienced Border Patrol agents.

Being a Border Patrol agent is challenging work, says Valencia. But she finds her work worthwhile. "It's a very rewarding career," she says.

For more information. For information on careers for Border Patrol agents, contact:

U.S. Department of Homeland Security
U.S. Customs and Border Protection
Washington, DC 20229
(202) 354-1000
www.cbp.gov/xp/cgov/careers

Emergency management directors

Emergency management directors help communities prepare for and respond to natural, technological, and other disasters. The primary concerns of emergency management directors vary, depending on where they are and

which hazards are typical of their area.

In Maine, for example, flash flooding from melting river ice is the "number one disaster," says State Emergency Management Director and Homeland Security Director Art Cleaves. "We put out early alerts and warnings, and we tell people to be careful. We know the areas where flooding occurs, and we make sure that evacuation plans and shelters are set up and that we are ready to alert people in those areas."

Emergency management directors work with and coordinate many different people and groups. Often, directors communicate with everyone from emergency response personnel to high-level officials. Cleaves is a key advisor for the Governor, with whom he works frequently. Serving as a point person helps directors achieve consensus in emergency planning and response.

Dewayne West, director of emergency services for Johnston County, North Carolina, meets with 40 or more organizations a year. "We are the department that sits above the turf wars and puts it all together—a sort of common denominator," he says. "A big part of my job is bringing other parties to the table."

Brenda Boone, an assistant to South Carolina's emergency preparedness director, affirms that purpose. "Most of what we do," she says, "is planning and coordination with other agencies." This might require combining forces with the departments of social services, public safety, transportation, or health and environmental control; the employment security commission; the State housing authority; or relief organizations, such as the American Red Cross.

Emergency management directors work closely with State and local officials to plan disaster response.

Local emergency management directors perform some tasks that are similar to those performed by State-level directors. "Usually," says Boone, "the people work-

ing in the local agencies wear many hats—they may also handle fire, emergency medical, or 9-1-1 services—because it's hard for a lot of smaller, less-populated counties to justify within their budget hiring someone just for emergency management."

West's case is one example: In addition to directing the county emergency services, he supervises its emergency management program and its fire and emergency medical services. For him, having multiple roles helps keep his job interesting. "Making that puzzle come together—fitting the right pieces and people together—is the best part of the job," he says.

Working conditions. Emergency management directors work long hours and often have irregular schedules. "I'm usually at work by 7:30 or 8 a.m., and I never leave before 5:30 or 6 p.m.," says West, who says he typically logs at least 50 or 60 hours a week. "And if I'm at local meetings, I'm out at night until 9 or so, or on weekends."

Directors typically have their own office space but, as West suggests, they frequently travel to attend meetings. The travel and other demands of the work—which include maintaining a constant state of alertness and taking responsibility during a crisis—can take a toll. "It's stressful," says West. Cleaves agrees: "It's a very busy and very demanding job."

Yet Cleaves and other directors say they enjoy their work, in large part because of its unpredictability. "It's the diversity each day that's the best part of the job," says Cleaves. "You're working with the legislature or the Governor's office one day and homeland security intelligence the next day."

Cleaves, whose State's proximity to Canada requires him to meet with Canadian officials as well as American ones, deals with both local and international issues. "I might have a meeting on the expense of home heating fuel and the possibility of power blackouts," he says. "Other times, I'm coordinating with border officials to make sure the information is flowing. I'm always swinging from one thing to another."

Employment, outlook, and earnings. In November 2004, according to BLS, there were 10,880 emergency management specialists. This total includes not only emergency management directors but also others who focus on similar issues.

BLS data also show that the top employers of emergency management specialists are local governments, State governments, general medical and surgical hospitals, power generation and supply services, and emergency and other relief services.

There is at least one emergency management director for each State, and there are other directors with similar functions throughout government and private industry. Other job titles for these workers include public safety or emergency preparedness director.

BLS projects that the number of emergency management specialists of all kinds will grow faster than the average for all occupations between 2004 and 2014, adding more than 2,300 jobs over the decade. "We're just beginning to understand that there's a need for this profession," says West.

BLS data also show that emergency management specialists earned a median salary of $45,670 a year in 2004, with the middle 50 percent earning between $33,390 and $62,370. The highest earning 10 percent made more than $81,860, and the lowest earning 10 percent made less than $24,630.

Preparation. Management, leadership, and people skills are critical for emergency management directors. "You have to have the ability to prioritize," says Cleaves, "to delegate and set in motion initiatives and see them through." But, adds West, success also depends on personal interaction: "Ninety-something percent of the job is working with other people."

Directors note, too, that technical knowledge is not enough; knowing *whom* to go to is equally important. "Having been a military officer before gave me a leg up on how to coordinate, and it is a valuable background," says Cleaves, a retired Army colonel. "But I didn't know how State governments worked. There was a lot of on-the-job learning for me."

More experience in local government would have been valuable, too, says Cleaves, to understand how first responders—such as fire, police, and emergency medical services personnel—work together; much of his work involves coordinating these groups. That may be one reason why, according to West, most emergency management directors have a background in fire fighting, emergency medical services, or local law enforcement. West suggests that people interested in emergency management volunteer or serve as interns to get field experience and a feel for what the work is really like.

Postsecondary education is another route to an emergency management career. "Some colleges today are offering a specific degree—a bachelor's or master's—in

emergency management ," says Cleaves. For example, the University of North Texas offers a Bachelor of Science in emergency management, which includes courses such as introduction to emergency management, hazard mitigation and preparedness, and disaster response and recovery and a mandatory internship for students without professional experience in the field.

Emergency management directors sometimes choose to earn other credentials. Completion of optional certification programs, such as the Certified Emergency Manager or associate emergency manager programs offered by the International Association of Emergency Managers, demonstrate further proficiency in the field.

For more information. Look into local opportunities in emergency management by contacting police, fire, and emergency medical services departments in your area. You can find the phone numbers for these agencies in the blue pages of the telephone book.

To learn more about Federal Government careers in emergency management, contact:

FEMA
500 C St. SW.
Washington, DC 20472
(202) 566-1600
www.fema.gov/career

Information about State emergency management offices is available through FEMA at the same address and phone number and online at **www.fema.gov/about/contact/statedr.shtm**.

The BLS occupational profile for emergency management specialists, which includes more data on their earnings and employment, is available online at **www.bls.gov/oes/current/oes131061.htm**.

Analytical chemists

Analytical chemists determine what a substance is and how much of it there is. Some strengthen homeland security by creating new ways to detect harmful substances, such as ones that could bring about a natural or human-caused disaster.

Ismael Cotte-Rodriguez, a Ph.D. student at Purdue University, is working to design instruments that might be used by airport security workers to identify chemical weapons or explosives. "It's totally different from what's been done before," he says. Cotte-Rodriguez spends most of his time in a laboratory, running experiments, getting results, and re-running experiments.

But the kind of chemistry used by scientists like Cotte-Rodriguez is decades ahead of the type that high school and college students are typically exposed to, says R. Graham Cooks, an analytical chemistry professor at Purdue University. There are no beakers, no test tubes, and no pipettes being used in modern labs, he says. Instead, nearly all of the analytical instruments are com-

Analytical chemists work in laboratories, researching either alone or in groups.

puter controlled, so most of the work is done at a computer. "It's very exciting," says Cooks. "You're running the reactions, trying different things—it's somewhere between chemistry and engineering."

Analytical chemists also study the relationships between various compounds and how different parts of these compounds interact. For example, an analytical chemist might consider such relationships in studying the best ways to dispose of chemical weapons.

"It's hard to get rid of chemical weapons in an environmentally friendly way, so it's challenging work," says Susan MacGregor, who does analytical chemistry work for the Edgewood Chemical and Biological Center in Edgewood, Maryland. MacGregor investigates new ways to detect chemical weapons and to decontaminate exposed areas.

Analytical chemists might also study air, water, soil, and other samples from the site of a disaster or attack to determine whether, and which, hazardous substances are present. Understanding reactivity, or how compounds behave under different conditions, is important for mitigation—or minimizing the harm caused—says Ray Miller, a chemist who also works at the Edgewood center. This information can then be used to train hazardous materials teams and first responders about health and environmental concerns and about how to contain and control chemical or biological agents.

Documenting what they do is another part of analytical chemists' work. Cotte-Rodriguez writes monthly progress reports of his findings. MacGregor's results must withstand legal scrutiny, so attention to detail is especially important in the reports she writes. "It is all in the paperwork," she says. "If you don't write it down, it didn't happen."

Working conditions. Working in a lab might require analytical chemists to deal with hazardous materials, so taking precautions is a priority. "The thing that makes the job unique is the safety requirements," says MacGregor. Everyone at her lab must be trained in the injection of antinerve agents and the use of a mask, and all workers must go through drills of escape routes.

Analytical chemists work both in groups and by themselves. In the lab where Cotte-Rodriguez works, for example, workers each generally have their own assignments. "Two to three people are assigned to a project," he says. "You can have help from someone else, but a lot of the work is independent."

Depending on the job, these workers may put in long hours. Cotte-Rodriguez says that he often works from morning until very late at night, sometimes until 2 a.m. But one reason why he works so hard is because he enjoys what he does. "What I like most is discovering new things, discovering different things, that can help other people," he says.

Having a chance to help others is what MacGregor likes about her job, too; being able to help the country is part of what makes her work worthwhile. "You get a patriotic feeling," she says. "You really do."

Employment, outlook, and earnings. There were more than 78,300 chemists of all kinds in November 2004, according to BLS.

BLS projects that, between 2004 and 2014, employment of chemists and materials scientists will grow more slowly than the average for all occupations. But jobs will be available.

Experts say that analytical chemists' versatility may give them more employment options than other types of chemists have. "Analytical chemists are generalists, problem solvers," says Cooks. "They're chemists who roll up their sleeves and get the job done."

On the other hand, specializing in homeland security research may limit analytical chemists' options. "There aren't many places where I can go," says Cotte-Rodriguez, "to do this specific type of work."

Median annual earnings of all chemists were $57,090 in November 2004, according to BLS. The middle 50 percent earned between $42,790 and $77,620, with the highest earning 10 percent making more than $100,020 and the lowest earning 10 percent making less than $34,070. Chemists who worked for the Federal Government had the highest earnings.

Preparation. Problem-solving skills and attention to detail are important for analytical chemists. Communication skills, both written and oral, are also essential if an analytical chemist is to share the results of his or her research.

A bachelor's degree in chemistry or a related discipline is the minimum educational requirement for analytical chemists. "Chemistry is a flexible degree," says MacGregor. "You can make of it what you want." Knowledge of other subjects can also be helpful to chemists, who increasingly collaborate with workers from other disciplines.

The American Chemical Society reports that increas-

ing numbers of chemists are returning to school to earn higher degrees. Cotte-Rodriguez is among them. His Ph.D. program, like many others in analytical chemistry, typically takes 4 to 5 years after the master's degree level. But experts say that jobs are available for workers with bachelor's, master's, or doctoral degrees.

Like other occupations in homeland security, many positions for analytical chemists in homeland security-related research require applicants to get a security clearance. New workers receive on-the-job training, but in many ways, says MacGregor, that training is ongoing. "You have to want to learn your whole life," she says.

For more information. To learn more about careers for chemists, including analytical chemists, contact:

American Chemical Society
1155 16th St. NW.
Washington, DC 20036
Toll-free: 1 (800) 227-5558
www.chemistry.org

The BLS occupational profile of chemists includes more data on their earnings and employment. It is available online at **www.bls.gov/oes/current/oes192031.htm**.

Exploring further

Visit your local library for books, periodicals, and other resources about careers in homeland security. One of the resources often available at public libraries is the *Occupational Outlook Handbook*, which includes detailed information on many of the occupations discussed in this article. The *Handbook* is also available online at **www.bls.gov/oco**.

Many jobs with the U.S. Department of Homeland Security and other Federal employers are posted and can be applied for online through the USAJOBS Web site, **www.usajobs.opm.gov/homeland.asp**, or by writing, calling, or visiting the online career sections of these employers. For example, additional information about the types of jobs at the Homeland Security Department is available by contacting:

U.S. Department of Homeland Security
Washington, DC 20528
(202) 282-8000
www.dhs.gov/dhspublic/display?theme=40

For help in finding and applying for homeland security jobs with the Federal Government, see "How to Get a Job in the Federal Government" in the summer 2004 *Occupational Outlook Quarterly*. The article is available online at **www.bls.gov/opub/ooq/2004/summer/art01.pdf**.

To learn more about security careers, read "Career Opportunities in Security," from ASIS International, a professional organization for workers in the security field. Free copies of the brochure are available from:

ASIS International
1625 Prince St.
Alexandria, VA 22314
(703) 519-6200
www.asisonline.org/careercenter/careers2005.pdf

Volunteer opportunities. Volunteering in a homeland security-related position is a good way to gain experience. Examples of organizations that provide volunteer opportunities include the American Red Cross and the U.S. Citizen Corps. "Almost anything you want to do, we have an opportunity for it," says Carol Hall, director of homeland security and Federal coordination at the Red Cross. For more information, contact:

American Red Cross National Headquarters
2025 E St. NW.
Washington, DC 20006
(202) 303-4498
www.redcross.org

To learn more about how you can become involved in your community, check out the Citizen Corps, **www.citizencorps.gov/programs**. Or, to locate a variety of volunteer opportunities, contact:

USA Freedom Corps
736 Jackson Pl. NW.
Washington, DC 20502
Toll-free: 1 (877) USA-CORP (872-2677)
www.usafreedomcorps.gov

Scholarships, fellowships, and internships. The U.S. Department of Homeland Security offers scholarships and fellowships for college students. For more information, contact the Department at the address above or visit online, **www.orau.gov/dhsed**.

To learn about other Federal opportunities, including scholarships or internships, contact:

U.S. Office of Personnel Management
1900 E St. NW.
Washington, DC 20415
(202) 606-1800
www.studentjobs.gov/e-scholar.asp