

A black and white close-up portrait of an older man with a full white beard and mustache, wearing a suit and tie. The image is slightly faded and serves as the background for the top half of the page.

Carnegie

RESULTS

Jefferson Science Fellows: A vision for harnessing the knowledge of academic scientists to help inform U.S. policymaking takes shape.

Launched in the wake of the terrorist attacks of 9/11 and the subsequent anthrax bioattacks, this unique program provides a vital link between policymaking social scientists in the U.S. Department of State and senior scientists and engineers from prestigious universities across the country. The Fellows help bridge the worlds of science and policymaking by providing a greater understanding and awareness of scientific knowledge to State Department officials on a wide array of issues such as biosecurity, climate change, food security, geography, space sciences and genetic evolution.

The Jefferson Science Fellows program began in 2004 with the appointment of five distinguished tenure-track researchers to one-year fellowships in the Department of State; the scientists remain available as consultants for five years after

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their fellowship year. That later classes had six to eight members, and that there is external funding for even a modest increase in the number of Fellows, points to an increasing interest in the program by the academic community. Ten Fellows were appointed in 2009, and when the new class is announced in September 2010, there will be a total of 51 former, current and newly appointed Fellows. The Fellows' salaries are provided by their universities; other expenses, for the first several years of the program, were funded by the John D. and Catherine T. MacArthur Foundation and Carnegie Corporation of New York, but in 2008 the program was institutionalized by the Department of State and it assumed these expenses.

As anticipated, there were formidable obstacles to overcome in developing the Jefferson Science Fellows program and, as is often true of new ventures, the many successes were offset by failures, especially in the initial stages of the project. Challenges remain to sustain this initiative and make it even more robust, especially in regard to increasing the value of the Fellows to their home universities, which continue to invest their own valuable resources in the program through their financial support of the awardees, a critical indicator of the expanding cohort of participating universities' belief that the benefits of being a Jefferson Science Fellow accrue equally to the Fellow, his or her home institution, and the nation, as well. All in all, this is an inspiring story about how an idea was brought to life and nurtured and how members of two cultures have learned and continue to learn from each other as they work toward infusing policymaking with sound scientific knowledge.

"I'm totally delighted with the program," says Nina Fedoroff, Ph.D., science and technology adviser to the U.S. Secretary of State. "I think it is one of the greatest contributions that my office—and I credit my predecessors—has brought to the department. We have young scientists coming in as AAAS Fellows,¹ but the Jefferson Science Fellows program brings in mature scientists who are quite accomplished, and each year the department understands and appreciates the value of the program. It has grown even in the three years that I've been at the State Department."

¹ For information about the American Association for the Advancement of Science (AAAS) and the group's Science & Technology Policy Fellowships visit their Web site, <http://fellowships.aaas.org/>.

Shaping a Vision

Events early in the first decade of the twenty-first century highlighted the need for creating new intersections between the culture of academic scientists and that of policymakers. "We realized that if there was going to be a generation of experts whose focus was at the nexus of security, policy, and bioscience, there was going to have to be an external mechanism to bring the two cultures together," says Patricia Moore Nicholas, who is project manager in the International Program of Carnegie Corporation. "Conversations with leaders at some of the best universities in the country indicated that scientists were conducting research without knowing the context of the security implications of their science, and they needed to be exposed to the policy implications of their work. Similarly, the people making policy needed to have grounding and an understanding in the science related to their policy decisions. We looked to universities to find ways that they could bring policy discussions to their science talent and how to bring scientific talent into the policymaking community."

In 2001, George H. Atkinson, Ph.D., a professor of chemistry and optical sciences at the University of Arizona, was serving as the first American Institute of Physics Senior Fellow for Science, Technology, and Diplomacy in the Department of State. His interest in the connection between science and policymaking increased in 2003 after he became the Science and Technology Adviser to U.S. Secretary of State Colin Powell. He continued to serve in that position until 2007 under then Secretary of State Condoleezza Rice. It was in this post that Dr. Atkinson says he "became more intrigued and concerned about how science was being used in decision making." He saw, firsthand, that the idea of uncertainty in science "was not well articulated on one side of the conversation, nor well understood on the other side." As a scientist, he knew that researchers were accustomed to studying a subject over a long period, yet he also understood the necessity for policymakers to make decisions quickly. "I began to see more clearly that these two communities (those of academic scientists and of State Department policymakers), which have long been understood to be different cultures, had to find better ways to communicate in a modern world."

As a vision for the Jefferson Science Fellows program began to evolve, hurdles loomed large: Getting prestigious

universities on board to pay the salaries of senior faculty members to serve in the Department of State for a year was pivotal. Dr. Atkinson set about identifying 19 major universities as potential participants and visited each of them; his powers of persuasion were put to the test as he talked with the president, provost, researchers and faculty at each institution about the value of the program and whether their institution would agree to provide the salary for a fellowship year. Sabbatical leaves are coveted by researchers as a time to study and conduct research, so he asked the universities to consider this year as part of their public service agenda and not categorize it as a sabbatical. His persistence and entrepreneurial spirit paid off: eighteen of the nineteen universities that Dr. Atkinson visited agreed to participate.

“That was the linchpin,” Nicholas explains. “Atkinson was key to getting the universities on board in this way, and without their participation, there would not have been a Jefferson Science Fellows program. He maintained that there is a difference between talking about science and talking science. The policymakers could talk about science, but you had to have someone who would bring the knowledge of the science to the table, not the knowledge about the science, and there is an important distinction. Atkinson would say, ‘This is my dream: I want to get to the point in the Department of State where someone who is negotiating an agreement policy would say they needed a Jefferson Science Fellow to bounce ideas off or bring a scientific credential to the discussion.’ He wanted them to be aware of the absence of that type of resource.”

Seeking to ensure that many opportunities were available to the new Fellows when they arrived at the State Department, Atkinson went from office to office, asking directors to write job descriptions for Fellows, which were published in a booklet. This also helped to introduce the program to State Department officials and provided an opportunity for State Department officials and Fellows to meet one another.

Recognizing the importance of providing stipends to Fellows for necessary expenses related to relocation, travel between Washington, D.C. and their home universities (where they continued to lead research groups) as well as to travel to State Department missions, Dr. Atkinson sought funding for these expenses from the MacArthur Foundation and Carnegie Corporation of New York. It wasn’t an easy sell

because it was often difficult to convince members of the State Department that engaging scientists was an important part of making sound policy decisions affecting issues on their agenda. Both foundations responded with grants for a three-year pilot program for the Jefferson Science Fellows, named in honor of President Thomas Jefferson, who was also the first U.S. Secretary of State and had many research interests in the fields of agricultural science and paleontology. Initial grants of \$900,000 by the MacArthur Foundation under its Science, Technology, and Security Initiative (which were matched by the Department of State), and a 2003 Corporation award of \$250,000 helped support the first three years of the program. The MacArthur Foundation gave an additional grant of \$250,000 over two years for a total of two grants equaling \$1,150,000 over five years, and the Corporation gave two additional grants, one in 2005 and another in 2007, each for \$400,000, for a total of three grants equaling \$1,050,000. Both foundations awarded the grants to the National Academy of Sciences, which handles administrative details of the program.

Kennette Benedict, Ph.D., who was then director of International Peace and Security at the MacArthur Foundation, said that the Jefferson Fellows program was part of a larger initiative of \$50 million in grants to university programs in the United States and abroad, as well as to selected policy institutes aimed at connecting the expertise of scientists with the information and analytic needs of policymakers. “While discussing this interest with members of the State Department, the Foundation learned of the proposal for the Jefferson Science Fellows program and immediately saw the value of developing the program as part of a broader set of activities,” she said, adding, “George Atkinson was the powerhouse and intellectual force behind that program.” Dr. Benedict is now executive director and publisher of the *Bulletin of the Atomic Scientists*.

“Carnegie Corporation and MacArthur Foundation contributions have been so important to getting this [program] off the ground,” Dr. Fedoroff says. “I am not sure it would have ever been implemented if it hadn’t been for their support. I think all the Jefferson Science Fellows and we who worry about more science input for policy are profoundly grateful to Carnegie Corporation and the MacArthur Foundation for investing in the program and believing in it.”

A key component built into the program from its inception was that the Fellows would be available as consultants for five years after they returned to their home universities. “A year is a short amount of time,” says Andrew Reynolds, who is deputy adviser in the office of the Science and Technology Adviser to the Secretary of State. Fellows should, he says, “Use the year to establish a relationship with their host office, to network with others in the State Department and, by extension, to the many agencies of federal government, as a first, critical step in establishing a long-term relationship in the international science and engineering communities.”

It was also anticipated that the Fellows would bring back their experiences to their universities, enriching their courses and introducing their students to the idea of pursuing a career that would combine a love of science with work in an area of government policymaking.

Establishing the Program

Selection of the first cohort of five Fellows was done by a committee composed of 21 members drawn from the leadership of the National Academies, the Department of State and professional science and engineering societies, along with distinguished academic faculty. Successful candidates were chosen not only for their scientific accomplishments but also for their interest in science policymaking and a strong ability to articulate scientific knowledge. On March 26, 2004, Powell, who was then Secretary of State, introduced the first class of Jefferson Science Fellows in a ceremony in the Benjamin Franklin Room of the U.S. State Department attended by representatives of the scientific community and the diplomatic corps and which included Jonathan F. Fanton, then president of the MacArthur Foundation; Nils Hasselmo, then president of the Association of American Universities, and Vartan Gregorian, president of Carnegie Corporation.

Powell, who holds a degree in geology from the City College of New York, introduced members of this first class, saying, “Just as in the days of Franklin and Jefferson, American scientists and diplomats share a common goal today: They both seek to apply the best knowledge we have to the most significant challenges we face. This is the spirit of science. This is the spirit of freedom that animates America

and inspires our thinkers and scientists to improve the lives of their fellow human beings.”

In September, the first Fellows arrived in Washington, D.C., and dream met reality. It was not easy for these pioneers to crack a culture so different from their own. The newly appointed Jefferson Science Fellows were senior people, influential leaders in their fields, yet at times they found themselves carrying out mundane tasks; even basics like finding a desk or locating housing sometimes were difficult. They found themselves in situations in which State Department personnel did not understand the role of these new visitors and confused them with AAAS Fellows. On the other hand, members of the State Department had their own set of high-level skills, and the Fellows were learning nuances associated with this unfamiliar culture, such as traveling on a diplomatic passport and being highly discrete about voicing opinions to members of the press or public, since what the Fellows said or wrote carried extra weight when they voiced opinions not as academics but as representatives of the U.S. government.

“Some offices [in the State Department] said, ‘This is a free guy.’ Others found much more thoughtful ways of using Fellows,” Atkinson says.² “There were many ‘therapy’ and educational sessions for the faculty serving as Fellows, who began to see how complicated it was to convert their scientific understanding and experience into information relevant for policymakers. One of the main cultural clashes involved the time available to consider an issue. Usually, scientists have lengthy opportunities to consider issues solely on their technical merits and complexities. In contrast, policymakers are routinely required to quickly reach a decision that must be shaped within a political framework completely unfamiliar to most scientists.

“There were some ‘teething problems’ with the program in the beginning, perhaps due to the clash of the culture of academia and diplomacy,” says Julian Adams, Ph.D., a geneticist who focuses on the biochemical and physiological bases of evolutionary change in microbial populations. Dr.

² Since leaving the State Department, Dr. Atkinson has continued to explore the intersection between science and policy in part by forming the Institute on Science for Global Policy (ISGP)—<http://www.scienceforglobalpolicy.org/>. As described on its Web site, ISGP “seeks to become a major international forum in which scientifically credible understanding of the major twenty-first century science and technology issues can be articulated and debated in the context of global policy perspectives.”

Adams is professor of molecular, cellular and developmental biology, and of ecology and evolutionary biology at the University of Michigan. He looks back on his year as a Fellow in the first cohort as a very positive experience, working with Josette Lewis, Ph.D., and the Agricultural Biotechnology team at the U.S. Agency for International Development (USAID). Dr. Adams says Dr. Lewis, who is now head of the Office of Agriculture at USAID, was “an outstanding boss and mentor.” Upon returning to the University of Michigan, he found that his experience as a Fellow was valuable in many ways. For example, he began incorporating some of his new knowledge in a course he teaches on genetics and society, adding a great deal of depth to the “society” portion of the class.

During her fellowship year, Melba M. Crawford, Ph.D., who is associate dean of Engineering for Research at Purdue University, worked with the International Organization Affairs Bureau and the Bureau of Intelligence and Research, where she helped coordinate activities with the UNESCO science sector and used her expertise in engineering and research in space sciences to support the response to the Indian Ocean tsunami. In looking back at her time as a Jefferson Science Fellow, Dr. Crawford says, “Each of us had to be proactive in determining our assignment within State and defining the projects on which we worked. It was a great opportunity to learn as much as you could and thereafter get engaged, trying to make the most of the experience.” She recalls learning a great deal about negotiations, including how issues are strategically presented and argued. “In academia, you are pretty direct in presenting your case,” she explains. “The person with the best theoretical justification or the most data is the most convincing. That’s just not the way it is in international interactions. It was a really interesting experience and actually impacted the way that I now ‘argue my case.’”

She has continued her association with the State Department, especially through her work using remotely sensed and geophysical data to assess and monitor changes that occur before and during natural disasters such as the 2004 Indian Ocean tsunami and the 2010 earthquake in Haiti, helping chart ways to reduce risk, improve response and facilitate reconstruction.

A Program Matures

The Jefferson Science Fellows program has been active under Secretaries of State Powell, Rice and Hillary Rodham Clinton, and the program continues to grow and thrive. Institutionalization began in 2007, and by 2009 the Department of State had completely assumed the funding that previously had been shared by the MacArthur Foundation and Carnegie Corporation and is currently supporting ten Fellows.

John Albert, Ph.D., from the State Department’s Office of Conventional Arms and Threat Reduction, is enthusiastic about his working relationship with James Harrington, Ph.D., who was in the 2005 class of Jefferson Science Fellows. Within weeks of becoming a Fellow, Dr. Harrington, who is professor of Ceramic Science and Engineering in the Fiber Optic Materials Research Program of Rutgers University at the Busch Campus in Piscataway, New Jersey, was part of the U.S. delegation participating in an international meeting of the Wassenaar Arrangement, a group of 40 international partners that works to negotiate export controls for conventional weapons and dual-use goods³ and technologies. Soon after this meeting concluded, Dr. Albert, who headed the U.S. delegation, relied on Dr. Harrington’s expertise on lasers and the closely related field of night vision devices to evaluate new proposals in this area in preparation for a new round of Wassenaar talks.

“Arguments are often quite heated within the U.S. inter-agency [community] concerning the physical characteristics of different devices,” Dr. Albert explains. “Jim served as my fact checker. He is not confrontational, but would ask those arguing a specific case to explain the technical merits in detail.” At the end of his Fellowship year, the State Department offered Dr. Harrington a contract as a consultant, and since then they have renewed the contract annually. As a consultant, Dr. Harrington chaired a special subgroup of the Wassenaar partners and successfully negotiated the first revision of laser controls in more than a decade. Dr. Albert says, “Jim understood and was fascinated by the science and came to understand the challenge of 40 nations working together to develop regulatory language that protects international security without being so restrictive that it stifles

³ Dual-use goods are items that are commercially available and can be used or easily converted for military purposes.

commercial and intellectual activities.”

John Dickson, who is director of public diplomacy and public affairs at the Bureau of Western Hemisphere Affairs in the State Department, also found the program valuable. “I had to pinch myself just to have that kind of smarts in my office and have somebody who wasn’t familiar with State Department and foreign policy provide a fresh perspective on our diplomacy,” he says. Dickson was referring to Timothy DeVoogd, Ph.D., who is professor of neurobiology and behavior in the department of psychology at Cornell University in Ithaca, New York, and a 2008 Jefferson Science Fellow, and to Diana Farkas, Ph.D., a professor of materials science and engineering at Virginia Tech in Blacksburg, Virginia, who is a current Fellow. Both professors have traveled to many countries in the Americas, giving presentations on their own specific research to scientific audiences, on basic science to young students and on scientific cooperation to universities and research organizations. As a direct outgrowth of this effort, Dickson says his department is arranging for scientists from these countries to work in U.S. laboratories and that his department is developing a “craigslist” style Web site to help facilitate and expand this effort. “The Fellows pump adrenaline into our office,” Dickson says, adding that Dr. DeVoogd continues to work as a consultant with his office. “It is a small program, but it has meant a lot to have the State Department be able to take advantage of the skills and talents of these scientists.”

When he first heard of the Jefferson Science Fellows program, Rob Bertram, Ph.D., who is acting director of the Office of the Environment and Science Policy in USAID, had some hesitations about it, in part because he thought that a year was a short amount of time to integrate a person into their office and get them up to speed. But then Dr. Bertram had an opportunity to work with Dr. Adams (including throughout the five years following his Fellowship year) and with Cynthia Baldwin, Ph.D., a current Fellow who is a professor of virology and microbiology at the University of Massachusetts in Amherst, Massachusetts. After seeing firsthand the value of these Fellows’ contributions, Dr. Bertram says, “My thinking has evolved, and I’ve become solidly positive and much less risk adverse because of the experiences our team has had. When you get the right person, a year is great and having that person as a consultant member

of the team ‘on retainer’ for an additional five years enhances the value of the year spent here for all involved and increases the personal satisfaction of the Fellow.”

Another State Department official who finds the program valuable is Brian D. Nordmann, Ph.D., who is director of the Office of Biological Weapons Affairs in the Bureau of Verification, Compliance, and Implementation. Dr. Nordmann, says, “I have had two Jefferson Science Fellows in my office, and not only was I able to get deep experience at virtually no cost to my office, but the office automatically gained ‘instant credibility’ in the interagency [community]. In a town where knowledge is power, the Jefferson Science Fellows give us a powerful wild card: not only do they understand the science, in many cases they *created* the science.”

“I hope it is a win-win for us, the Fellow and the university,” Dr. Nordmann says. “We profited from having Fellows on our staff and in the building, and the Fellows were exposed to the inner workings of the federal government, which may have been a revelation of sorts to them, and, hopefully, the university profited because it introduced new opportunities both for the students and for future research.” The two Fellows who worked in Dr. Nordmann’s office are Marvin Paule, Ph.D., who is professor and former chair of Biochemistry and Molecular Biology at Colorado State University in Fort Collins, Colorado, and a 2007 Fellow and Steven Geary, Ph.D., who is professor and director of the Center of Excellence for Vaccine Research at the University of Connecticut in Storrs, Connecticut, and a 2008 Fellow.

Over the past six years, the Jefferson Science Fellows program has gained a solid reputation and has become better known on campuses, making recruitment of applicants an easier task than it had been at the outset. “It was a fairly intensive start-up in terms of generating prospective applicants,” says Ray Gamble, Ph.D., director of the Fellowships Office of the National Academies and administrator of the MacArthur Foundation and Corporation grants for the Jefferson Science Fellows program. “We now have alumni who assist us in outreach; this, coupled with an increased level of recognition in the academic community, results in a greater response each year with respect to the applicant pool. The last couple of years there have been 40 to 50 applicants for 10 positions. While this is not a huge number,

the applicants are all very interested in the program and all highly qualified.” Dr. Gamble also said that the Jefferson Science Fellows program “has become a model for the Franklin Fellows program, and several other groups within the State Department and USAID have inquired about our processes and successes.”

In February 2010 a convocation that included 39 of the 41 former and current Fellows as well as Dr. Fedoroff, Dr. Atkinson, representatives from many offices of the State Department, USAID, AAAS and several other groups provided an opportunity to take stock of the program and for Fellows to share experiences with each other, discuss interdisciplinary interests and generally coalesce as a group.

Reynolds says of the meeting: “The convocation gave us two days to take stock of what we have done, what we hope to do and the lessons learned—good and bad—of the first five years of the Jefferson program. It also offered an opportunity for Fellows to meet each other, many for the first time since they served in separate years. So we reinforced a secondary effect, which allows partnering between fellows in different cohorts, giving them an opportunity to combine disciplines and critical thinking to address large global issues such as climate change, food security, or new and renewable energy supplies. That adds a wonderful second wave of benefit to the program and the powerful network with U.S. universities it is cultivating. We want Jeffersons to feel as if they are members of a broad fraternity from the Atlantic to the Pacific and from the Caribbean to the Canadian border; with Internet-based research and collaboration possible, that’s much more easily facilitated. The Jefferson Science Fellows bring a credential to the State Department and to USAID in a significant, systematic way, and we hope it is one of the most lasting legacies of this office and of the advisers who have served in this capacity here.”

Although many Fellows have returned to their campuses and integrated their experiences in the State Department into their classrooms and laboratories, the convocation indicated that there is untapped potential in this area to do more to encourage this aspect of the program. “As much as the program has been able to accomplish, it probably could have gone more full throttle,” says Nicholas. “So much of the energies have been expended in getting this entrenched

in the Department of State, which is no easy feat, but the many universities who have committed to these Fellows need to be seeing some more value added. There hasn’t been a full exploitation of this fellowship experience at the universities that have signed on to apply their science talent to the Department of State. This is not a huge detriment to the project—and perhaps it is something that hasn’t been possible until this point—but it is a focus that needs to be developed over the next phase of the project, so that it can be made even more robust than it already is.”

Another issue is that there is substantial turnover of personnel in the State Department, meaning that mentors to the Fellows often leave and that incoming officials have to learn anew about Jefferson Science Fellows. “Problems that remain are largely more the cultural problems of the State Department,” says Dr. Fedoroff. “The cast of characters in most offices changes, so you have to continually educate them; this is a real issue. Our State Department people are generally in positions for only two or three years, so entire office staffs turn over, and there is no institutional memory.” She added that the department is working to streamline the bureaucratic processes associated with ensuring security clearances for their consultancy work. Dr. Fedoroff also said that she hopes USAID will take over the funding for Fellows that work with their department.

“The entire question of how Fellows can establish mutually effective consulting agreements after their year-long residence within the State Department remains challenging,” says Dr. Atkinson. “This part of the program represents a major opportunity for the Fellows to continue to make important contributions to issues affecting U.S. science policy and diplomacy, issues which are getting more complicated and urgent for the State Department. Given the structure of the State Department, it was hard to launch this part of the program. It still requires a great deal of attention to ensure that the program works well for each new group of fellows as well as for alumnae: continuing to work with State Department offices to help identify mutually beneficial opportunities for Fellows and to prepare respective job descriptions, to resolve the mismatches that can occur and to encourage distinguished academic scientists and engineers and their universities to commit the human and financial resources to the program.”

Jefferson Science Fellows: A Selection Of Participants

Jerome E. Dobson, Ph.D., who is professor of geography at the University of Kansas, is in the current cohort of Jefferson Science Fellows and in that post works closely with Lee Schwartz, Ph.D., who is the Geographer of the United States. Dr. Dobson, who is also president of the American Geographical Society, has collaborated with the Department of State's Office of the Geographer since 1982. "That is very unusual among the Jefferson Science Fellows, but it has worked very well for me, and, I think for the office," he says. Dr. Dobson is recognized internationally for his work with geographic information systems, notably the LandScan Global Population Database that is the world standard for estimating populations at risk during wars and natural disasters. He led the development of this database while working at Oak Ridge National Laboratory. In his work as a Fellow, he leads a pilot project called DemoBase which helps to estimate populations at risk in foreign countries during disasters such as hurricanes, earthquakes, wars and terrorist acts. The results help government officials determine the extent and nature of relief aid required. He says it was a combination of "good luck and good judgment" that the U.S. Census Bureau chose Haiti as the first country in the world to be so studied. Exceptionally detailed population data thus were available when the devastating earthquake struck in January 2010.

When asked what attracted him to the field, Dr. Dobson said, "People either think spatially or they don't." When his college roommate switched his major to geography, for the first time Dr. Dobson realized that it was possible to major in geography, and he switched his own major the very next morning. To learn why he believes it is urgent to revive the neglected study of geography in the United States, read his article, "Bring Back Geography!" (<http://www.esri.com/news/arcnews/spring07/articles/bring-back-geography>)

Katherine Radtke, Ph.D., who is an associate professor at the University of Maryland at Baltimore County in the area of medicinal and organic chemistry focused on treating infectious diseases and viruses, was a 2006 Jefferson Science Fellow and since then has continued an active association with the Department of State. In 2001, she worked with the U.S. Department of Health and Human Services and the Department of Defense on a joint smallpox project with the Russian government. That piqued her interest in the world of diplomacy and led to her work as a Fellow. "The Jefferson Science Fellowship was a fantastic opportunity to see a different side of science that we as academic scientists are not necessarily exposed to," she explains, adding that as a Fellow she had security clearance and attended meetings that gave her insight into the decision-making process. "Sometimes policies are not decided on the basis of science, but are made for diplomatic reasons," she says. "Other negotiations may be going on that may affect the decision. It's a lot more complicated than we on the outside could ever realize." As a Fellow she worked on several projects. One, with Indonesian officials, involved helping develop improved practices to secure pathogens. Another, with Russian officials, extended to several science issues, such as nanotechnology. Notably she also helped provide guidance to the State Department about the changing landscape for Russian science, in particular issues with the Russian Academy of Sciences, which was in turmoil at the time.

Dr. Radtke has encouraged her students to pursue careers that involve an intersection between science and government. "Three of my graduate students have now gone into work in the government," she says. "One is working with the Food and Drug Administration, another is doing post-doctoral studies at the Aberdeen Proving Ground and yet another works with a government contractor." Dr. Radtke is currently teaching an undergraduate honors course on science, policy and diplomacy that

brings together students from various disciplines such as the sciences, art and foreign language. She says, “It is a fun class that turns students on to these issues and gets them to look at both sides of a complicated situation.”

Kalidas Shetty, Ph.D., who is professor of food biotechnology at the University of Massachusetts in Amherst, was in the first class of Fellows and is still actively involved as a consultant. “Once a Jefferson Science Fellow, always a Jefferson,” says Dr. Shetty, though officially the program calls for only a five-year continuation as a consultant after the fellowship year. His research involves new directions in food science, safety and biotechnology, with a main interest in exploring the potential of food to provide not only basic nutritional requirements but to help in preventing diabetes, cardiovascular disease and other chronic disease conditions. He also is working to standardize requirements for food safety around the world, something he emphasizes as the United States imports about 40 percent of its fruits and vegetables. As a Fellow, Dr. Shetty traveled around the world to speak on behalf of the State Department, visiting nearly 30 countries since 2004.

Commenting on his relationship with people in the State Department, Dr. Shetty says, “We have similar philosophies in that people in both cultures think globally and strongly believe that the United States can use science and technology to do good and, through this, advance diplomacy and development around the world. But we approach situations differently, so it is a very complementary relationship. We are a good resource for each other, and this could not have happened without the Jefferson Science Fellows program. The personnel turnover in the State Department is very high, so it falls on individual Fellows to find their niche and seek opportunities. We have built such a strong relationship that I think they are dependent on us and vice versa.” On campus, Dr. Shetty seeks opportunities to translate his experiences into the classroom, incorporating more global content into his teaching and research and, he says, “bringing young people more in tune with global issues, specifically with universal challenges of food security, food safety

and sustainable food production, which are problems that we are facing as a world.”

“Being able to see firsthand how the world of diplomacy operates has been a completely eye-opening experience,” says **Mohammed Zikry, Ph.D.**, a 2008 Jefferson Science Fellow, who is professor of mechanical and aerospace engineering at North Carolina State University in Raleigh, North Carolina. His research area is related to the computational modeling and analysis of material behavior at scales ranging from the nano to micro. During his fellowship year, Dr. Zikry worked on several issues in the Africa Bureau of the State Department, focusing his efforts on providing scientific and engineering advice in the area of conflict diamonds or “blood” diamonds. He worked to aid the Kimberly Process for Rough Diamonds, a multinational consortium that seeks to fingerprint diamonds and identify their source of origin to ensure that only legitimate diamonds are sold in the marketplace, thus preventing insurgency groups from illicitly using conflict diamonds to fund their war efforts and to halt the exploitation of children, forced by these rebels to work in diamond mines.

In assessing his time as a Jefferson Science Fellow, Dr. Zikry says, “Very few people in the State Department have a deep understanding of science. They may be excited about an idea, but don’t want a whole explanation about an idea such as climate change. Instead they want to know whether an idea will work and want to get the ball rolling. One of the beauties of the Jefferson program is that it allows interaction between the people in the world of science and engineering with those in the world of policy.” He added, “The Fellows who have been successful have learned what’s going on before they start lecturing to people [in the State Department].” Since returning to North Carolina State University, Dr. Zikry has continued his work as a consultant with the State Department and is exploring with his own and other universities the possibility of forming an institute that would seek ways to mix policy issues with science and engineering. “That is,” he says, “the huge take-home message.”

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Though it faces ongoing challenges, the Jefferson Science Fellows program stands as a workable model for “how to get the job done,” not only within the State Department but potentially, within other U.S. departments and agencies. To that end, it has clearly already made a great deal of progress in striving to meld the world of scientists and engineers with that of diplomats, working, as Andrew Carnegie wrote in his most famous essay, *The Gospel of Wealth*, “to do real and permanent good in this world.”

You can find an extended version of this Results with selected bios of Jefferson Fellows at http://carnegie.org/fileadmin/Media/Publications/jefferson_science.pdf

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