

Engineering Professor Spends a Year Working at the U.S. State Department

As a Jefferson Science Fellow, Rajan Sen spent a fascinating year learning how engineering concepts become global policy.

“Science is more essential for our prosperity, our security, our health, our environment, and our quality of life than it has ever been before.”

—President Barack Obama, 2009

The Jefferson Science Fellowship (JSF) at the U.S. Department of State, administered by the National Academies, is offered to about a dozen senior faculty from across the United States every year. Fellows serve their initial year in Washington DC, but remain a resource to the State Department for an additional five years. Last year Rajan Sen, professor of structural engineering was the first Jefferson Fellow appointed from USF and one of only three structural engineers ever chosen to participate in this decade long program.

Assignments at JSF involve providing cutting edge expertise in science, technology, engineering and medical advances that impact policy decisions at the State Department level. Sen’s broad-based experience in structural analysis and design, using both traditional materials and advanced composites was a good fit for advising policy makers on current issues in urban infrastructure. A keen advocate of good design and sustainable practices, he has returned to USF this academic year with an expanded awareness of risk-informed decisions and the global reach of engineering advances.

“It was an amazing year in Washington DC,” he says. “Not just with the inter-agency meetings that the position required, but opportunities to attend lectures and talks by world renowned experts in leading think-tank institutions.” One of the important responsibilities of a Fellow is to represent the State Department in inter-agency committees. “Some are very high level with the objective of establishing clear national goals for science and technology which report directly to the White House,” he explains.

Much of Dr. Sen’s work was specifically for the Department of State’s Bureau of International Organization Affairs - Office of Global Systems. This bureau interacts largely with the United Nations. One of the appointments was to the National Science and Technology Council’s (NSTC) Subcommittee on Disaster Reduction (SDR). This took him to UN Geneva as a member of the multi-agency U.S. delegation to the fourth session of the Global Platform for Disaster Risk Reduction.

Sen gave four researched presentations during his tenure: a distinguished JSF lecture at the U.S. Department of State; lectures at the U.S. Embassy in Nairobi for UN Habitat; at UN New York for the United Nations Development Program; and at the White House Conference Center to NSTC’s Infrastructure Subcommittee. The predominant theme was the strategic use of available materials and systems to make cities more resilient and future directions for infrastructure research in the new millennium.

Other projects that he participated in included the Hurricane Sandy Rebuilding Task Force. "I was able to contribute to that because coming from Florida we know a good deal more about hurricanes than people in the Northeast." He explained that good design can save billions of dollars in disaster rebuilding. And it does not have to be complicated. "In Bangkok, the subway entrances are five feet above the ground which prevents flooding." He cites the Stormwater Management and Road Tunnel (SMART) in Kuala Lumpur, Malaysia, as another example of good design. The tunnel normally carries traffic but reverts to a drain when there is severe rainfall that can lead to flooding.

As part of a review of glacial lake over burst flooding in Nepal, Sen proposed adapting a rapid repair system developed by the U.S. Army Corps of Engineers to plug leaks. In this system a balloon-like structure is filled with water and allowed to float. Water currents guide it to potential openings which are then automatically plugged. "Construction equipment is difficult to transport to remote mountainous regions and this system could be used as a temporary fix for glacial lakes in danger of failing in places like Nepal or Bhutan. The technology is inexpensive, lightweight, and can be assembled on site."

The overall experience has left Professor Sen with a deep appreciation for the work of the State Department. Witnessing the change of Secretaries from Hillary Clinton to John Kerry, and the fast pace of work there, he observed that the Department literally runs 24/7. "Information that is three-days-old, is *old*. The processes in place are both rigorous and efficient. Personnel are extremely versatile and knowledgeable, many with impressive credentials." Another observation was the number of undergraduate interns at the State Department. "Our USF students should join this program," he explains. "There is a strong emphasis on written and verbal communication, and valuable experience can be gained even in the short time spent as an intern."

Of all his projects, Sen's favorite was working with disaster-recovery issues on an international scale - some of which are still ongoing. He was able to effectively contribute by translating complex engineering concepts that policy makers could understand and implement. There is a greater appreciation for the exchange of technical expertise, networking opportunities and international contacts that were made possible in one action-packed year.

"Living in the West End in downtown Washington DC, was also a privilege, and the vibrant urban lifestyle was a unique and enjoyable experience. Visits to the Library of Congress and Politics & Prose bookstore for instance, gave a real sense of the literary, political, and cultural pulse of the city. All in all this was a great year," he recalls, "and will always be memorable."