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Profile/Arati Prabhakar; She's Not Just Setting Standards

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Published: August 01, 1993

GAITHERSBURG, Md. — ON her way to becoming the first woman to win a Ph.D. in applied physics at the California Institute of Technology, Arati Prabhakar realized what she did not want to do: immerse herself in narrowly focused research. "If the worst thing you learn in graduate school is what you don't want to do, that is not all bad," she said.

Instead she and her thesis adviser decided she should apply her learning to public policy. "We had this problem of deciding what to do about me," she said. "Finally he suggested that I should become a Congressional intern, even though neither of us was quite sure what a Congressional intern did."

That was in 1984, and the conversation changed her life. Ms. Prabhakar, who was born in India and whose name is pronounced AR-ah-thee pra-BAH-kar, took her adviser's advice and began a decade-long career as a technology analyst for the Government. Her reward came this year, when President Clinton named her the director of the National Institute of Standards and Technology, formerly the National Bureau of Standards.

The appointment comes as the agency is significantly expanding its role, preparing to become a key player in the Clinton Administration's efforts to improve the competitiveness of civilian industries, as opposed to the emphasis of recent years on military industries.

Ms. Prabhakar wants the institute, once simply a setter of technical standards like weights and measures, to play a big role in channeling to small and medium-sized American manufacturers technologies that can make them faster and more efficient.

The appointment of a 34-year-old woman from outside came as something of a shock in a 3,000-employee agency where advancement had historically been from the inside and by seniority.

"This was quite a departure for a staid old institution that a lot of people still refer to as 'the Bureau,' " said Daniel S. Greenberg, publisher of the newsletter Science & Government Report. "Most of her predecessors were products of the agency and spent most of their careers there."

Unlike the Reagan and Bush Administrations, which opposed most Federal efforts to assist American industry, the Clinton Administration enthusiastically supports technology policy and has selected the National Institute of Standards

and Technology as the civilian agency to help manufacturers.

The institute is one of the few Federal agencies where the statement "I'm from the Government and I'm here to help you" would not be greeted with derision among most business people.

If the Administration has its way in Congress, the agency's budget will grow from about \$380 million to \$1.4 billion over the next four years. The additional money would go to enlarge a group of seven manufacturing technology centers into a nationwide network of 30 centers with 100 smaller outreach offices in smaller cities.

The centers, almost always staffed by engineers and managers with ties to academic institutions, are intended to provide small and medium-sized companies with the computer skills and other technology and organizational knowledge that large corporations develop internally. If the Administration gets what it wants, the centers will be linked by a high-capacity communications network to the national laboratories, so that technologies developed in the nuclear and space programs, for example, can be of use to manufacturers.

One example, Ms. Prabhakar said, is underwriting the process of adapting composite materials developed for the space program for use in sporting goods.

The intent, she said, is to make the agency a partner with American manufacturers and to underwrite developments that no single company would find practical.

Ms. Prabhakar came to the United States at the age of 3 with her mother, who was seeking an advanced degree in social work at the University of Chicago. When she was 7 the family moved to Lubbock, Tex., where she grew up. She breezed her way to a bachelor's degree in electrical engineering at Texas Tech University but then found the going a lot tougher at Cal Tech, one of the nation's premier technical schools.

"I went from being at the top of my class, like everyone else in the program, to being in the middle of my class -- on a good day," she said in an interview with Science magazine earlier this year. That was where she also discovered her lack of appetite for the meticulous investigation of highly specific subjects that is the focus of traditional research.

"I didn't want to do deep and narrow," she said. "I like learning a little about a lot of technologies and making connections." Nevertheless, she pressed on to get the Ph.D., convinced that it would open doors.

Afterward, she headed for Washington as a Congressional fellow in the Office of Technology Assessment. Once there she delved into issues where technology and policy meet, preparing reports for Congress on subjects like "Microelectronics Research and Development" and "Intellectual Property in an Age of Electronics and Information."

HER work was noticed at the Defense Department's Defense Advanced Research Projects Agency. Darpa, now known as Arpa, has helped keep American manufacturers in the electronic and microchip industries by financing research into advanced technology and production methods. Unlike N.I.S.T., its projects must have military applications.

Craig Fields, a former director of Darpa, said Ms. Prabhakar has the unusual combination of technical knowledge, entrepreneurial flair and ability to get things done within government in an agency that emphasized individual responsibility.

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"She had the ability to work with her military customers and understand the needs of the companies involved," Mr. Fields said. "She was able to think about long-term goals at the same time, which is a pretty rare set of skills."

By the time she left Darpa, she was managing one of the largest offices in the agency, with more than \$300 million in contracts with businesses in the semiconductor, optoelectronic and flexible-manufacturing fields. The job included helping to manage the Sematech chipmaking coalition.

"She was one of the high fliers over there," said Fred Nichols, executive director of the National Coalition for Advanced Manufacturing, a Washington association that supports industrial modernization.

Her new agency, N.I.S.T., has, as the Bureau of Standards, been working with businesses for almost a century in defining what a pound, a volt and other measurements mean. In 1988, Congress, concerned about the deterioration of many American industries, added technology promotion to standards setting.

But in the face of a hostile administration, financing for the new program was limited to \$18 million last year. One consequence of that was that each of the manufacturing centers faces declining Federal financing, with all Federal support ending after six years. Now, if the new President wins his battle, those centers will have far more support.

Ms. Prabhakar said she was not sure whether those programs should continue indefinitely. "I'm of two minds about it," she said. "I'm not comfortable with the Federal Government funding anything forever. But I find an arbitrary period of time equally nonsensical."

TO fulfill its new role of assisting American manufacturers, Ms. Prabhakar said, N.I.S.T. will have to be more aggressive, reaching out to business to determine what it needs. "Until now this was a laboratory, with a few experimental programs on the side," she said.

"In the United States we focused on basic science and got very good at that," she said. "Now we have to figure ways of getting technology to small and medium-sized businesses. We have to help companies overcome barriers to the use of technology."

She said the Government must help manufacturers improve for the long term, as other governments are doing. "This is the beginning of a process that will not be completed quickly," she said. "The metric is industry -- how well does it perform. We won't know if it is working after four years, but in 20 years we will know."

On another topic, Ms. Prabhakar said she has heard a lot from Indians since being named to head the agency. "People in the Indian community have said this proves our kids can do anything they want," she said.

She said she was not surprised to be running an agency with 3,000 employees at her age. "I can't be President since I am a naturalized citizen," she said, "but I figured everything else was fair game."