

**BHAVANI THURAISSINGHAM**

# “I really want to be challenged.”

If you want to have a MITRE career like Bhavani Thuraisingham has had, there is one overriding principle to keep in mind: Sleep is overrated.

“SHE NEVER SLEEPS,” said Maria Zemakova, Thuraisingham’s former MITRE colleague and currently manager of the Information and Data Management Program at the National Science Foundation. “She works all the time. I’ve never seen anyone who works as hard as Bhavani.”

The part about not sleeping is, of course, an exaggeration. But simply reading about Thuraisingham’s life and career can be exhausting. Thuraisingham, who recently celebrated her 14th anniversary with MITRE, juggles her work in Washington with the NSF (to whom she is currently on loan) and family time with her husband in Boston and her son in London. Her intellectual journey has been just as rigorous, encompassing research and work in database security, real-time database systems, and data mining, as well as the possibility of combining seemingly disparate elements of database management. And

whenever Thuraisingham, always on the lookout for new challenges, wanted to add to her understanding and expertise, she found a way at MITRE to do just that.

“It’s really been a wonderful experience,” Thuraisingham said. “What I really like is the variety that we are given at MITRE. There are so many opportunities, and you can always move on to other things. So I’ve been continuously moving and doing various things within MITRE.”

Doing things within MITRE has, in turn, led to recognition outside it. When Thuraisingham recently was honored by the Institute of Electrical and Electronics Engineers (IEEE) with a 2003 Fellow Award, it was for “contributions to secure systems, including database systems, distributed systems, and the Web.” It was this work that dominated Thuraisingham’s early work at MITRE for several sponsors and led to three patents for MITRE, as well as the IEEE’s Technical Achievement Award in 1997. It also spawned over 400 technical papers, including over 50 journal papers, five books—with a sixth slated for publication later this year—and appearances at the White House and the United Nations as an expert on the emerging technique of data mining as a potential tool for countering terrorism.

But Thuraisingham’s books and papers don’t gather dust on bookshelves, and therein lies one of the key ingredients of her success.

### Ideas—and action

The doctorate in Theoretical Computer Science Thuraisingham holds, as well as her subsequent career, is testament to her formidable intellect. But along with the academician’s curiosity comes an executive’s eye for results, and a knack for knowing and bringing together the people who can help turn theory into reality.

“When she’s in a meeting,

she will absolutely not go unnoticed,” said Zemakova. “You will immediately know that you’re in the presence of somebody who is a doer, who is extremely sharp technically and also is a born leader. She’s very assertive, and she has a very good political instinct—who to talk to, and how to get things done.”

After joining MITRE, Thuraisingham immediately immersed herself in the issue of enhancing the security of data collected and stored at different sites—which, as she points out, was “really a novelty at the time.” Working with Harvey Rubinovitz, senior INFOSEC engineer, Thuraisingham researched and designed systems that connected data systems in Bedford, McLean, and Fort Monmouth. The system they built had multiple layers for users who, depending on their security status, could get different kinds of information and communicate with each other.

One key product of their research was the inference controller, which gathers pieces of unclassified information and, equipped with user profiles, determines whether a user asking for the information should access it. Thuraisingham and Rubinovitz also worked on prototypes for securing object systems, in which databases are arranged as a collection of objects rather than tables.

When Thuraisingham wanted to branch out into real-time database systems and data mining, she found the opportunity at MITRE. Working with John Maurer, section leader, CAFCS2S, and others, Thuraisingham experimented with real-time systems technology for the AWACS program. The team was among the first to propose a Real-Time Object Request Broker that is now available commercially, and started the real-time special interest group at the Object Management Group, a consortium of about 700 companies, which develops the standards for Object Request Brokers.

At about the same time, Thuraisingham joined the information technology division led by Henry Bayard. While working for six years under the Massive Digital Data Systems



Program, she worked with data mining, among other technologies. Beginning in 1995, Thuraisingham took the leadership of a new department in data management and helped start a research program on data mining, drawing on past contacts to put researchers, like Chris Clifton, in touch with the appropriate sponsors.

“She put me together with sponsors so that this work would happen,” said Clifton, now at Purdue University. “Without her involvement—even when she wasn’t working directly on this problem—it would never have happened.”

Thuraisingham’s work in data mining took on a new dimension when she started a two-year stretch at NSF in October 2001. Zemakova asked Thuraisingham to come to the NSF because “I knew Bhavani would be very proactive in managing the program,” and Thuraisingham wanted to add further to her experience and her network.

“I felt that coming to Washington for a couple of years and learning the sponsor environment would help me a lot,” Thuraisingham said. “I thought NSF would be something I would enjoy and would be a good environment for me to learn the research, contracts, and grants process. But I never expected what would really happen at NSF.”

What would really happen was the heightened post-9/11 emphasis on counterterrorism research, including the potential use of data mining. Thuraisingham started a new program in Data and Applications Security, winning approval for the program in six months (“That really is totally unheard of—it would normally take over a year to do what Bhavani accomplished in six months,” said Zemakova). She also became involved in a working group on counterterrorism and cyber-security and has represented the NSF at meetings at the White House and the UN on data mining for counterterrorism as well as on bioterrorism.

It has all built up to Thuraisingham’s latest book, which will set forth some of her ideas in an evolving field.

### Balancing security and privacy

The book, scheduled for publication in April, proposes a concept called a federated database, or a group of organizations that can come together, share data, and mine it. Such an association, Thuraisingham says, could make it easier for organizations to detect cir-

cumstances—by themselves not suspicious—that may, when the pieces are put together, indicate a terrorist threat.

“Example: Somebody in Minneapolis wants to learn to fly an airplane, and he does not care about takeoff or landing,” Thuraisingham said. “The same for people in Florida: They don’t care about takeoff or landing. So far, they have not been able to make those connections, because the systems were not there to connect the dots, and also we have to flag that as an unusual situation. So that means we really need to have all of the data, and we need organizations to share data, and that is not easy.”

Data mining for counterterrorism is not without its critics. Many are concerned that the privacy of individuals may be violated in the process, and Congress is considering a bill that would place a moratorium on data mining pending a review of the practice. But Thuraisingham is pursuing research on privacy-sensitive data mining, a new area dedicated to protecting privacy while sharing data, and she says progress in this area can be made only if the research is allowed to go forward.

“If we don’t push the data mining technology for national security, it’s not even going to help the privacy people because at least we can continue to do some research on privacy,” Thuraisingham said. “But by stopping all this, we would just go several steps backward. ... I would be very interested in seeing the reaction to my book. So we’ll see.”

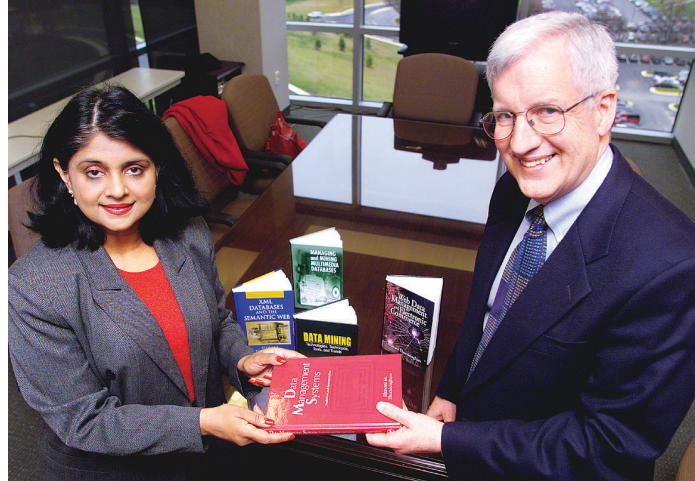
Clifton believes the research on privacy-sensitive data mining is, in part, a tribute to Thuraisingham’s ability to look ahead.

“I would say that Bhavani, in a sense, saw some of the handwriting on the wall well before Congress even knew it was there and worked to encourage the research so that the work would be started when the need arose,” he said. “There have been a lot of areas where she’s been ahead of the game.”

### The next challenges

When Thuraisingham looks back on her accomplishments, she is quick to credit MITRE’s environment for helping make them possible.

“While I worked hard to develop myself at every juncture, MITRE never stifled my en-



Bhavani Thuraisingham recently presented copies of her books to MITRE President and Chief Executive Officer Marty Faga.

thusiasm or innovation and was always there encouraging me and allowing me to pursue my interests,” Thuraisingham said. “I am certain that this would not have been possible in a for-profit corporation, as the bottom line with for-profit corporations is how much money you can generate and how much profit you can make.”

When MITRE President and CEO Marty Faga looks at Thuraisingham’s career, he sees the possibilities of MITRE in microcosm—of talent nurtured, of challenges issued and met, all in a way that benefits herself, the company, and the country.

“Our whole culture at MITRE is geared toward making people like Bhavani feel they can not only come here, but can find the kind of challenges and opportunities for growth and service that will make them want to stay here,” Faga said. “Bhavani wants to do more than come up with ideas. She wants to put them into practice, and the fact that she saw MITRE as the ideal place to do that really speaks volumes. We’re proud of her contributions, and proud of the role we have played in enabling her to display her talents and build upon them for the nation’s benefit.”

Thuraisingham says she takes her career one day at a time and isn’t sure what she will try to do when her NSF tenure ends in September. She is considering several ideas, including work in sensor information management, secure semantic web, and—yes—another book, this one summarizing her experience in database security. “I’ll go back to MITRE—and find new challenges and opportunities.”

If history is any guide, she won’t have to look hard.

—Russell Woolard