

THE WORLD IS THEIR STAGE



BY ANITA HOUK

Cyber security, calamities caused by earthquakes, riots that result from political speeches — a trio of U of M researchers offer solutions to real-world problems.

Upon the biology of humans, computer science professor Dipankar Dasgupta has built a body of work he refers to as bio-inspired computing.

"My work," Dr. Dasgupta declares, "is so diverse and vast, I can't keep track myself."

However, upon request, he graciously bows to necessity and abbreviates.

"My current work is all on cyber defense — how to build survivable computing systems that are more secure," he notes, explaining that his research helps computer and Internet users stay one step ahead of "the bad guys" — computer hackers.

"Every electronic device will soon be controlled by connecting through the Internet," continues Dasgupta. "My interest in human biology is in the mechanism — how the mechanism works so the body can survive. If we somehow transfer that knowledge of how the immune system evolved and kept the species surviving, that information will give a lesson for the

Cyber security breaches seem to be more the norm recently with personal information regularly being mined and distributed by computer hackers. U of M computer science professor Dipankar Dasgupta, founder of the Center for Information Assurance, says it is important to stay “one step ahead of the bad guys” as he looks for ways to ensure a safer Internet experience.

computational system. We want to learn how to build a computational system that is self-monitored and self-healing – like the human body can be.”

Work in this emerging field has landed Dasgupta the chair of the IEEE Computational Intelligence Society’s task force on bio-inspired approaches to cyber defense. He recently developed an in-depth Negative Authentication process to filter out illegal access attempts against computer network accounts. He has organized countless local and national cyber security summits (including one at the request of the White House) and prepared reports that have generated a new research program within the Department of Homeland Security.

At interview time, he’s just back from a week in Finland, where he helped to confer a doctorate and gave three keynote addresses concerning Cloud security.

“Who has access to all that info stored up there?” someone asks.

“We don’t know,” he admits. “That’s the problem and why we propose an insurance model. The customer would pay a premium and be covered in case of a data breach.” But commercialism is not his business.

After showing his visitor to a chair in his office, Dasgupta chats casually, then seats himself behind his desk and virtually disappears. He is barely visible behind a cliff of papers, journals, references and reminders. In one hand is his smartphone (which one knows only by its ping, as it can’t be seen). When teased, the professor only half-jokes:

“Yes, these are my piles! And I know exactly where things are. Every semester ends, and I think, ‘I will clean a bit.’ But it never happens. And if someone touches these piles, I get mad!”

At the U of M, Dasgupta is founding director of the Center for Information Assurance, which is a National Center for Academic Excellence in Information Assurance Education and in Research, and he is director of the Intelligent Security Systems Research Laboratory. His work has received government research support of more than \$10.5 million. Grantors include the National Science Foundation, Office of



Naval Research, Department of Defense and the Federal Emergency Management Agency. One new effort – “Puzzle-based Cybersecurity” – is a collaborative effort with Jackson State Community College and involves utilizing specialized software to help community college teachers and students learn the concepts and approaches of cyber security (\$364,864; NSF).

“Puzzles stimulate and give new insight into out-of-the-box thinking,” says Dasgupta. The project taps into the game theory approach, which is finding support in academia.

Where does family fit into his academic endeavors?

“My wife,” he boasts, “is the biggest supporter of my activities.”

His wife, Geeta, has two master’s degrees, and the couple is originally from the eastern part of India. “I was a lecturer at one university and she at another. Her brother was my colleague.” An overture was made, families were introduced and they met. The couple has two daughters, Sonali and Sukanya, who are pursuing higher education.

Dasgupta has set the bar high. At the U of M, he has been named the Dr. Pat E. Burlison Professor; received the Willard R. Sparks Eminent Faculty Award (2012), Dunavant Professorship (2007) and Distinguished Research Award (2002, 2006); and he recently won the August 2014 Eye of the Tiger Award from the U of M Alumni Association.

The professor is also on the MIT cyber security advisory board; written two books (*Artificial Immune Systems* and *Immunological Computations*); is on the editorial boards of five professional journals;

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and he has given more than 150 talks at conferences and universities. But what does he show off at this moment?

"Did you see this?" He passes a silver, engraved photo frame over the foot-high piles of papers on his desk. "What do you think?"

Captured accepting an engraved silver tray of appreciation from the Alumni Association is a beaming Dr. Dipankar Dasgupta.

So happily human.