



PRESIDENTIAL EARLY CAREER AWARD FOR SCIENTISTS AND ENGINEERS

At work on the next frontier of security

Scott Craver's research could help stop a terrorist attack — or lend privacy to people living under an authoritarian regime.

Information security expert Scott Craver's core research interest is in digital watermarks, which can be used to provide proof of ownership, as copy protection devices or to send covert messages. Watermarks are commonly used in movies, music and images; they could also be used to protect scientific data, software and other types of information.

Craver and his team of students develop algorithms to break watermark systems. "We need to think like an attacker in order to be certain of what types of attacks are available," he said. "The attacks we come up with aren't useful tools for a criminal. That's part of the point in finding attacks on security systems: If you find an attack, you're preventing it from being useful to an adversary because now people know how to protect against it."

Last year, Craver was among 100 recipients of the prestigious Presidential Early Career Award for Scientists and Engineers (PECASE). The award includes a grant of \$200,000 a year for five years.

Craver said the funding will allow his team to continue to pursue a unified theory of detection. "All of our hard security problems these days are really detection problems," he said. "This is the last frontier, or at least the next one. These problems have applications to all possible adversaries. You're talking about anything from kids who want to make trouble to organized crime."

Craver earned his doctorate in electrical engineering from Princeton University in 2004 and came to Binghamton that year as an assistant professor of electrical and computer engineering. He is the first Binghamton researcher to receive a PECASE since the program began in 1996.

"The person who is trying to evade detection is not necessarily the bad guy," Craver noted. "If Alice and Bob are trying to communicate secretly and a third party is trying to catch them, who's the bad guy? It depends. If the person doing the detection is in law enforcement and trying to uncover a terrorist plot, that's one possibility. If Alice and Bob live in a country where the Internet is highly censored and they're just trying to communicate with a normal level of privacy, the person doing the detection is not necessarily the good guy."

"We're not trying to figure out how to score a win for one side or the other, but to find out in these sorts of situations who will win." ■