

Quantitative Models for the Deterrence of Terrorists

Supported by the Beckman Faculty Research Grant and the Baker Foundation

Prof. Susan Martonosi Minal Shankar Daniel Walton

Rational behavior are those actions that seek to maximize a particular objective, or “utility” function. Terrorists are known to select attacks to maximize their utility, which could depend on death, destruction and religious glory. Moreover, they will avoid attacks with high operational costs or high risk of capture. We developed probability and game theoretic models to determine optimal security policies in light of deterrence.

The Role of Information

Terrorists base their decision of whether or not to attack on their perception of the quality of security in place. Focusing on airport security checkpoint screening, Minal Shankar ('08) examined how the defender might control the information available to the attacker to achieve a higher level of deterrence. She identified situations in which investing into security improvements and disclosing their effectiveness was preferable to withholding the information.

Optimal Security Allocations

Daniel Walton ('07) used a game theory framework in which a defender must choose how much to invest into securing a target to minimize his expected loss, and an attacker must choose how much to invest into attacking the target to maximize his expected benefit. He showed that the defender's investment into security is highest when the attacker and defender value the target to a similar degree. If the attacker values the target significantly more than the defender (or vice versa), then the optimal defense is lower.