Professor Bets Math Can Help Fight Terrorists

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University of California, Riverside Assistant Professor of computer science Christian Shelton will be working over the next three years on algorithms to help the U.S. Air Force conduct computer modeling to help predict the behavior of groups ranging from several dozen people to the dynamics of nations – known as social and cultural modeling.

The project is designed to help U.S. leaders answer questions such as: How do you predict what a terrorist cell is likely to do in a rapidly developing situation with a multitude of variables? What are the decision-making vulnerabilities of a squad of soldiers doing anti-insurgent work? Or, how will the leadership of a rogue state likely react to cajoling, threatening or military force in a rapidly evolving situation?

“We have models but they need to be extended mathematically and algorithmically,” Shelton said. “By doing this we can have a higher degree of accuracy in approximating inferences as to how a group of people will react.”

Shelton said the new developments in this research will be in extending what computer scientists call discrete time processes – slices of time analyzed and sequenced – into continuous time processes, which attempt to fill the gaps between those slices of time and improve estimates of likely future moves.

The Air Force Office of Scientific Research’s (AFOS) Young Investigator Program is funding Shelton’s project to be carried out with

other scientists, sociologists and anthropologists. The program supports scientists and engineers who have received a Ph.D. or equivalent degrees in the last five years, and who show exceptional ability and promise in conducting basic research.

The objective of the program is to foster creative basic research in science and engineering and to enhance early career development of outstanding young investigators. The program also seeks to increase opportunities for young investigators to recognize the Air Force mission and related challenges in science and engineering. Each award brings with it $100,000 annually for three years.

Shelton's previous work at the Bourns College of Engineering, which touches on this current project, includes studies for Intel modeling computer network activity and how to spot unusual behavior.. He has also done life-history modeling based on the British Household Panel Survey, a longitudinal survey of more than 10,000 people followed since 1991.

Source: University of California, Riverside