

RESEARCH

\$12.5M Grant Will Help Predict Spread of Online Social Behavior

By Mark Schlueb '93 '21MA | November 16, 2017



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The Defense Advanced Research Projects Agency has awarded a combined \$12.5 million in federal contracts to two UCF research teams to [develop models and massive simulations](#) to help understand online social behavior and predict the spread of information in online social networks.

DARPA awarded \$6.3 million to a team led by Associate Professor Wingyan Chung of the University of Central Florida's Institute for Simulation and Training, and another \$6.2 million to a second team led by Assistant Professor Ivan Garibay, director of UCF's Complex Adaptive Systems Laboratory in the College of Engineering & Computer Science.

It's part of a new SocialSim program from DARPA that's been in the works for more than a year. The federal agency has contracted with nine teams from universities and research institutes across the country to gain a deeper grasp of social network dynamics. UCF was the only institution to have two teams funded.

The researchers are tasked with developing accurate and scalable simulations to provide DARPA with a better understanding of online social behavior and its evolution. Potential applications include countering the spread of misinformation by terrorists and malicious hackers, profiling online populations for social research, and forecasting online sales and activities for e-commerce.

"Different users take advantage of social media and other media channels to spread their ideas," Chung said. "By accurately modeling and simulating such activities, our techniques will enable better understanding of such behavior and inform the development of policies and strategies."

Chung's team will develop a suite of models, tools and techniques to illuminate socio-behavioral properties and network interactions in large online populations. He will collaborate with co-principal investigator Elizabeth Mustaine, professor and chair of the Department of Sociology, who specializes in social theories, criminology and cyber stalking.

Chung, who is director of the Institute for Simulation and Training's Cyber Intelligence Lab, has done extensive research on social media analytics, covering such topics as border security, e-commerce business intelligence and the spread of infectious disease. Mustaine has researched cyber bullying, and supervises graduate students to conduct this research.

Garibay's team will create and train thousands of AI "agents" to think and act like humans on social media networks. Garibay compared it to a hurricane prediction model, but instead of a storm's path and speed, it would predict how far and how fast propaganda would spread on social networks.

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“DARPA considers how information is propagating in social media an issue of national security. The core area of interest for DARPA is how foreign states can affect the opinion of people in the United States,” said Garibay, of the Department of Industrial Engineering and Management Systems.

The AI agents created by Garibay’s team have varied traits that govern how they would interact with one another online. Some are more emotional, some more rational, some more social, and together they will react like humans do on social media. When scaled up with the help of massive computing power, the AI network will be able to simulate how quickly information of different types will spread. Armed with a better understanding of propaganda propagation, researchers could potentially counter it more quickly.

“This will be like a test bed – a human-like network modeling with human-like behavior that replicates the phenomenon that occurs in real social networks,” Garibay said.

Garibay and his colleagues used a similar approach in earlier research, developing a model to determine what led to the population decline of the Anasazi people in the Southwest in the last millennium.

Garibay’s UCF team on the DARPA project includes Associate Professor Gita Sukthankar of the Department of Computer Science; Stephen M. Fiore, professor in the Department of Philosophy and the Institute for Simulation and Training; and Assistant Professor Alexander Mantzaris of the Department of Statistics.

While UCF is the lead institution on both teams, others are subcontracting. Researchers from the University of North Carolina Charlotte, Florida Institute of Technology and Cornerstone Software Solutions, a company in Central Florida Research Park, are subcontracting for Garibay’s team. And researchers from the Florida Institute for Human and Machine Cognition and the State University of New York at Albany are subcontracting for Chung’s team.

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