

# CMU TEAM USES AI to Help Machines Play Nice with Humans

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*Carnegie Mellon University researchers Cleotilde Gonzalez at the Dietrich College of Humanities and Social Sciences, Henny Admoni at the Robotics Institute and lead investigator Anita Williams Woolley at the Tepper School of Business received a \$2.8 million DARPA grant to study team collective intelligence and the theory of mind in relation to human and machine interactions.*

## **AN INTERDISCIPLINARY GROUP OF RESEARCHERS HAS RECEIVED A \$2.8 MILLION DARPA GRANT TO ENHANCE MACHINE-HUMAN TEAM COLLABORATIONS**

Three Carnegie Mellon University researchers — the lead investigator, Anita Williams Woolley at the Tepper School of Business, along with co-investigators Cleotilde Gonzalez at the Dietrich College of Humanities and Social Sciences and Henny Admoni at the Robotics Institute in the School of Computer

Science — are leveraging their expertise in organizational science, cognitive science and artificial intelligence to explore how AI can help humans work better together.

Woolley believes this award is an important achievement not only for her and her co-investigators but also for Carnegie Mellon.

“As leaders in both team research and technology, it’s an important acknowledgment of the role we have played and continue to play in pushing the frontiers of these disciplines,” Woolley said.

The researchers received a \$2.8 million DARPA grant to study team collective intelligence and the theory of mind in relation to human and machine interactions. Team collective intelligence relates to the ability of a team to work together

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— Cleotilde Gonzalez,  
Carnegie Mellon University Research Professor

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across a range of tasks. Theory of mind explores how a person can understand what others are thinking and how they may react to something based on subtle nonverbal cues.

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The researchers aim to leverage these concepts to develop a machine theory of mind for a synthetic team coach that can interact with a group to improve task outcomes.

A synthetic team coach will benefit from a previously developed cog-

nitive model that can remember the actions of the team members. This memory will allow the coach to understand and accurately predict what the team members will do next and intervene at the team level at the right time to improve the task at hand.

“I’m very interested in how intelligent synthetic agents can help teams coordinate better,” Admoni said. “I am looking forward to using my knowledge of AI and human-robot interaction in this domain of group coordination, which is a new area for me.”

The goal is to have the coach work with team members to aid in the exchange of ideas and improve collaborations so that tasks are performed faster and more efficiently.

The cross-disciplinary team behind this cutting-edge research is as intriguing as the research itself.

Gonzalez lends cognitive and decision sciences prowess, Admoni offers human-robot interactions knowledge, and Woolley brings expertise in collective intelligence in teams.

“We continue to push the frontiers of these disciplines,” Woolley said. “Since ours is an all-female Carnegie Mellon-based team of scientists, it shows that women are leaders in these fields where they have been typically underrepresented.”

The project also is drawing on the talent at all faculty levels at CMU and offers young researchers, both undergraduate and graduate, a model of a women-led team in the male-dominated fields of science and engineering.

“I hope that I can be a role model for women in computer science,” Admoni said. “I think that science would benefit greatly from more diversity in the field.”

#### **ABOUT THE RESEARCH**

*This research, titled “An Integrated Theory of Human-Machine Teaming,” will expand on existing models to test theories and evaluate the quality of intelligence collected in a variety of environments. DARPA supports projects in technological research useful for national security.*