

Researchers seeking better use of aircraft, personnel and fuel

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US Air Force Office of Scientific Research-funded Colorado State University researchers are trying to solve computationally difficult problems related to logistics planning. Credit: US Air Force Photo, Capt. Dustin Doyle

Air Force Office of Scientific Research-funded Colorado State University researchers are trying to solve computationally difficult problems related to logistics planning, vehicle routing, resource allocation, circuit design, wireless frequency assignment and scheduling.

Dr. Adele Howe and co-researcher, Dr. Darrell Whitley are passionate about finding the best possible solutions to some of the Air Force's most difficult problems by using a tremendous amount of data to verify analytical results on real problems.

The scientists combine techniques and results from research disciplines that do not routinely overlap and as a result they are able to look at the problems in a novel way.

"Our research advances will enable the Air Force Materiel Command to have a more efficient delivery means as well as a better use of aircraft, personnel and fuel without being plagued by logistic problems," she noted.

Howe and Whitley have challenging work now and in the future as they advance their knowledge on a wide scale in mathematics, statistics, operations research and computer science. They must invest a lot of time in computational verification of their small problems and the large ones will require even more of their time.

"It is not even possible in a lifetime of [Central Processing Unit](#) time to verify the ideas," said Howe. "Thus, we continue to seek new tools and techniques for better analysis of the problems and for writing more efficient programs."

The scientists are finding that while they may devise a good solution to one difficult problem, what works for one does not necessarily solve another.

"Prior to this research no one has been able to precisely compute the statistics of these problems and derive an efficient algorithm for combining two solutions and obtaining with high probability a new solution that is the best possible one," said Howe.

Provided by Air Force Office of Scientific Research

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