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## Keep Your Motor Running

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# University of Dayton, Ohio (url: <http://www.udayton.edu/index.php>)



## Keep Your Motor Running

**05.18.2007 | Engineering, Research, Faculty** University of Dayton researchers have developed a method to show where jet fuel deposits have the greatest potential for clogging engines.

The findings, published in a recent edition of the journal *Energy & Fuels*, give jet engine designers a head start in designing around problem spots. Millions of dollars could be saved because of less downtime for aircraft, reduced maintenance costs and increased fuel efficiency. Fliers also will be safer because there is less risk of engine failure because of fuel deposits, according to Steve Zabarnick, University of Dayton Research Institute fuel science group leader and a UD mechanical and aerospace engineering professor.

"Jet fuels are used to propel and cool the aircraft," Zabarnick said. "But when the fuel absorbs heat while cooling certain parts, it forms deposits before being combusted for propulsion."

Zabarnick, colleague Jamie Ervin and doctoral students Zachary West and Nick Kuprowicz developed chemical and engineering models for predicting deposits in fuel nozzles, heat exchangers, narrow valves and filters. Ervin is a UD mechanical and aerospace engineering professor and UDRI modeling and simulation group leader.

Zabarnick said current ways to reduce or eliminate fuel deposits include restricting the fuel's temperature, using systems that remove oxygen from jet fuel or using fuel additives, some of which have been developed by UDRI researchers. However, restricting the fuel's temperature seriously limits the plane's efficiency. Fuel additives can be costly, and the oxygen removal systems have not been perfected yet.

The researchers performed much of their work at nearby Wright-Patterson Air Force Base.

"(As a student), it's great having these facilities and the UD Research Institute's structure of an academic and professional setting," said West, who performed experiments and measurements of different fuels and the rates of deposit build up. "(Students) are in the lab and involved with people in the field. Your input is valuable to a project like this."

UD is the top Ohio university in federally funded engineering research, Department of Defense research contracts and grants, and aerospace research. Among Catholic universities nationally, UD performs the most non-medical research. Nationally, UD ranks 13th in federally funded engineering research and 14th in Department of Defense research contracts and grants.

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