

From Stealth to Climate Change – the Pursuit of Propulsion-derived Particulate Matter Characterization at Missouri S&T

Dr. Philip D. Whitefield

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*7th Staffer
Lecture*



**2:00 p.m.
Friday
Oct 21 in G3
Schrenk Hall**

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Abstract: Propulsion-derived particulate matter (PM) characterization has been a major research area in physical/analytical chemistry at Missouri S&T since 1988. In this retrospective lecture the nature of this combustion by product and criteria pollutant, will be discussed, along with the research and regulatory methods developed to monitor and characterize it. By way of example, research related to engine type and operating conditions for both airborne and space flight will be presented as will the influence of fuel formulation. The desire to understand the influence on PM emissions arising from alternative, renewable aviation fuels relies heavily on the huge database that exists for conventional fuels much of which has resulted from the application of the methods and data interpretation developed at MS&T examples will be discussed.

About the speaker: Phil Whitefield is a professor emeritus of Chemistry at Missouri University of Science and Technology and the Director of the MS&T Center of Excellence for Aerospace Particulate Emissions Research, where he leads an internationally recognized research program associated with the chemical and physical characterization of ultrafine particulate matter. Specifically, he collaborates with a team of researchers from academia, the federal government, and the private sector, studying the particulate matter generated by aerospace activities. This research program, initiated in 1990, has three major thrust areas – emissions measurement, interpretation of emissions measurements and the development of novel state of the art instrumentation tailored specifically to support the measurement and interpretation thrusts. This research has resulted in, to date, externally sponsored funding in excess of \$24M and the recent adoption of a global regulatory standard measurement methodology for jet engine certification of non-volatile particulate matter (nvPM) emissions. He is the Principal Investigator for Missouri S&T as one of the founding universities in the FAA, NASA, Transport Canada Centers of Excellence – for Alternative jet fuels and environment, (ASCENT) and Partnership for AiR Transportation Noise and Emissions Reduction (PARTNER) and is the Centers' lead scientist for the Emissions Characterization component of the Center's research. He was a lead author on the IPCC special report entitled "Aviation and the Global Atmosphere" This special report along with others led to the IPCC jointly with Senator Al Gore receiving the Nobel Peace Prize in 2007. Phil currently advises the FAA on Sustainable Aviation Jet Fuel emissions and on emissions issues relate to commercial space transportation. He is a member of the American Chemical society and The society of Automotive Engineers (SAE) E31 committee. He has over 100 publications and presentations recorded in the open literature and one patent.