The Department of Mechanical Engineering presents:

Dr. Gary L. Achtemeier, Ph.D.

USDA Forest Service Scientist and Co- Director of the FCAMMS
Southern High-Resolution Modeling Consortium

Friday, May 21st
11:10AM-12:00PM
Bourns Hall A265

Superfog as an Air Quality Hazard of Wildland Burning.

Abstract: Superfog, defined as dense fog reducing visibility to less than 3 m, is at times associated with wildland burning in the southern United States. Although fire-related superfog can occur anywhere, it is most often found where burning is done frequently in a humid environment. For years associated with multiple vehicle accidents and fatalities, superfog had never been measured because it occurred unpredictably, remotely, and in darkness – usually just before sunrise. This talk follows the trail of research from accidental production of superfog in 1996, through measurements of temperature and relative humidity in smoke from smoldering fuels in the aftermath of prescribed burns, to the measurement of superfog itself. Superfog occurs when two humid airmasses at widely different temperatures are mixed in the presence of an enormous quantity of cloud condensation nuclei. There can result fog with liquid water content up to 50 times larger than LWC found in cumulus clouds.

The 9 January 2008 I-4 disaster in Florida that caused a 70-vehicle pileup and claimed 5 lives is described. A combination of a regional scale weather prediction model (MM5), a local scale smoke/wind model (PB-Piedmont) and a superfog screening model describe the meteorological conditions that set up the disaster and show that the disaster can be predicted.

Bio: Gary L. Achtemeier received his Ph.D. in Meteorology from Florida State University in 1972. From 1972-1974, he was involved with tornado research at the National Severe Storms Laboratory at Norman, OK. He was driver of the van the proved the concept of tornado chase and laid out protocols shown in the movie, "Twister". From 1974-1990, Dr. Achtemeier worked at the Illinois State Water Survey, Champaign, at the campus of the University of Illinois. His research included severe storms (hail & tornadoes), weather modification, use of variational calculus to assimilate diverse meteorological data, and use of research radar to diagnose behavior of large insects. In 1990, Dr. Achtemeier joined the USDA Forest Service as a research meteorologist. He is past CoDirector of the FCAMMS Southern High-Resolution Modeling Consortium and past Team Leader of the Smoke Management Team located on the University of Georgia Campus at Athens, GA. His current research focuses on time-dependent modeling of local smoke transport at night over complex terrain (PB-Piedmont). His research also includes modeling plume rise over prescribed fire (Daysmoke), use of "recursive rules" and "free agents" for modeling winds over complex terrain (Mountain Wind Model) and fire spread (Rabbit Rules), field projects to measure smoke particulate concentrations at various locations downwind from prescribed fires, and superfog. He is author or co-author of 93 papers and reports including 33 papers in professional journals.

COLLOQUIUM

MECHANICAL ENGINEERING