



# CAES

The Connecticut Agricultural Experiment Station

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## CAES SEMINAR SERIES

### **“A Biophysical Framework for Modeling Aerial Dispersal of Plant Pathogens”**

**Dr. Donald Aylor**

Plant Pathology and Ecology, CAES

**Wednesday, March 1, 2017**

12:00 noon to 1:00 p.m.

Food and coffee will be available at 11:45 a.m.

Jones Auditorium

The Connecticut Agricultural Experiment Station

123 Huntington Street, New Haven, CT

Devastating plant diseases are spread by airborne spores, sometimes over long distances. Dr. Aylor will describe models of spore dispersal that could be used to help assess the potential for airborne spread of disease between nearby and distant fields. Dispersal is comprised of a series of interconnected biophysical processes, minimally described as take-off, transport, and deposition. These processes involve detailed fluid-particle interactions governed by length scales ranging from millimeters to hundreds of kilometers. Principles of fluid engineering are used to quantify the motion of spores as they escape the viscous boundary layer near plant surfaces, move through the roughness sublayer, and escape into the convective boundary layer where they can be transported to nearby and distant crops. Initial stages of dispersal occur in a region of highly inhomogeneous turbulence dominated by intermittent wind flow patterns. Lagrangian stochastic simulation models are adapted to describe some principal elements of this problem. To help tie together the great range of distance scales involved in aerial dispersal, I will examine the fate of a spore during the course of its flight: first as it is released a few millimeters into the air, then as it escapes from the ground cover canopy via turbulent transport, until it is deposited on a susceptible host.