

ATS/CIRA Colloquium

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**Predicting the spread of wildfires:
The importance of fire interactions with the atmosphere,
ecosystems, and topography**

Hosted by Jeff Pierce

Friday, February 5, 2016

ATS room 101; Discussion will begin at 11:15am

Refreshments will be served at 10:45am in the weather lab

Advancements in computing power have created new opportunities for the use of numerical models in wildfire research. Models like the Wildland Fire Dynamics Simulator (WFDS) and FIRETEC attempt to represent interactions between the dominant processes that determine wildfire behavior such as convective and radiative heat transfer, aerodynamic drag and buoyant response of the atmosphere to heat released by the fire. The development of these approaches creates new opportunities to provide additional perspectives concerning aspects of fire behavior that have been observed in the field and in the laboratory, allow for sensitivity analysis that is impractical through observations and pose new hypotheses that can be tested experimentally. Recent examples of the use of FIRETEC and WFDS in this fashion include: 1) the influence of vegetation heterogeneity and variability in wind fields on predictability of fire spread; 2) the interaction between ecosystem disturbances such as insect attacks and potential fire behavior; and 3) the effects of complex topography on fire behavior and 4) investigation of the 3D fire/atmosphere interaction that dictates multiscale fireline dynamics. In this presentation I will discuss the use of these new tools to investigate the influence of canopy structure on convective heating and cooling of canopy fuels and the impact of heterogeneous vegetation distribution/aggregation on wind penetration into canopies and crown fire behavior using two different examples from recently published research. In addition I will discuss the role that these tools have in developing new conceptual models, improving the design of experiments and the challenges associated with model evaluation.

Link to colloquium videos and announcement page: <http://www.atmos.colostate.edu/dept/colloquia.php>