**Meteorology Seminar**

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**Title:** FLash characteristics and precipitation metrics of western u.s. lightning-initiated wildfires

**Major Professor: Dr. Henry Fuelberg**

**Date:** March 28, 2019 **Time: 1:00 PM**

**Location:** Werner A. Baum Seminar Room (353 Love Building)

**(Please join us for refreshments served outside room 353 Love @ 12:30 PM)**

**ABSTRACT**

The United States Forest Service (USFS) bases their wildfire predictions on cloud-to-ground lightning flash density thresholds greater than 5 fl km-2. High flash densities and low precipitation are often emphasized with storms since they are associated with wildfire ignitions. Yet, greater flash rates tend to occur in the areas of greatest rainfall. This study focuses on 95 lightning-initiated wildfires in the western United States during the year of 2017. Lightning data provided by the National Lightning Detection Network (NLDN) were analyzed to determine which strike(s) likely caused each fire, as well as the strikes that did not. Detailed analysis of cloud-to-ground lightning characteristics and thunderstorm characteristics such as stroke density, precipitation rate, and 24-h storm-relative QPE totals are presented. Statistical analyses using a Wilcoxon-Mann Whitney rank sum test were performed to reveal differences between lightning flashes that ignite wildfires and those that do not. Results indicate multiple-stroke negative polarity cloud-to-ground flashes dominated the fire starts. In addition, wildfires were initiated in areas with low stroke densities. Based on these tentative findings, the USFS may need to revisit their methods for wildland fire prediction. Rain rates at the locations of fire starts were 8.03 mm h-1 less than those of non-fire starting flashes, while 24-h QPE totals were 5.28 mm less. These differences were found to be statistically significant. The results of this thesis will help expand the limited knowledge of operational lightning and wildfire meteorology. However, considerable additional research is needed.