



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Holly J. Zhou	Project Number S1121
Project Title The Effect of Fire on Hydrolytic Enzyme Activity in the Grassland/Shrubland Ecosystem: A Fluorometric Analysis	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project is to use fluorimetric assay analysis to determine the activity levels of CBH, BG, BX, AG, NAG, LAP, and AP four years after the 2007 Santiago Fire. If fire results in a long-term negative effect on enzyme activity, precautionary measures could be taken before carrying out prescribed burns and in creating ecosystem models.</p> <p>Methods/Materials Soil samples were gathered from Irvine Ranch (four samples from the burn site and four samples from the control site). I assayed for soil pH, soil moisture, and hyphal lengths in each sample. Fluorimetric analysis with fluorescent dye conjugated substrates and the addition of NaOH was then used to determine the activity levels of hydrolytic soil enzymes. Fluorescence was then converted into activity (nmol/gh).</p> <p>Results The wildfire did not seem to have a significant effect on enzyme activity ($P > 0.05$), but in the burn site, CBH, BX, AG, AP, and NAG had lower average activity levels than the control site. BG, however, had activity levels similar to those of the control site. This is coupled by lower NAG activity, which degrades chitin, a compound that makes up fungal cell walls.</p> <p>Conclusions/Discussion CBH, BX, and AG play an important role in C cycling, and a decrease in their activity could reflect a decline in fungal and bacterial abundance. Reduced AP activity may reflect a decline in P availability, which could be because of lower P mineralization. Decreased enzymatic activity may be associated with decreased soil CO₂ emissions, causing a negative feedback to climate warming.</p>	
Summary Statement My project focuses on analyzing hydrolytic enzyme activity after a wildfire in the grassland/shrubland ecosystem using fluorometric analysis.	
Help Received Used lab equipment at UCI under the supervision of Dr. Treseder	