

The Department of Mechanical Engineering presents:

The Master's Dissertation Defense of:

Stephanie Pham

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2PM, Bourns Hall A265

**Experimental Investigation and Numerical Simulation of
Smoke, Fire, and Biological Heat Transfer**

Master of Science, Graduate Program in Mechanical Engineering

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Dr. Marko Princevac, Chairperson

The present work documents three diverse projects done in the Laboratory for Environmental Flow Modeling. They are in the following order: 1) Interception of Smoke from a Forest Canopy, 2) Flame Merge Experiment, and 3) Examination of Testicular Thermoregulation. The first project is an experimental investigation of possible filtering of particulate matter from wildfire smoke dispersing upwards through forest trees of the canopy layer. If the filtering is significant, then it should be accounted for when modeling air quality impact, visibility, and other environmental effects of surface fires in forests. The second project is an experimental investigation of the processes of flame merging and tilting with no wind velocity. It was determined that the flame distance, fuel mass, flame size, and fuel bed configuration are the parameters that influence when the flame will “see” the other flame or obstacle. The third project is to further knowledge of thermoregulation processes of the testicle by examining the influence of cell metabolism and perfusion in tissue through numerical simulation. Detailed modeling of temperature field development inside the isolated and non-isolated testicle show negligible influence.

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