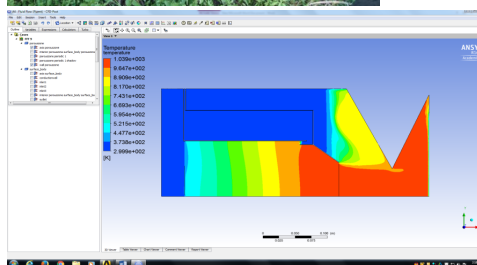
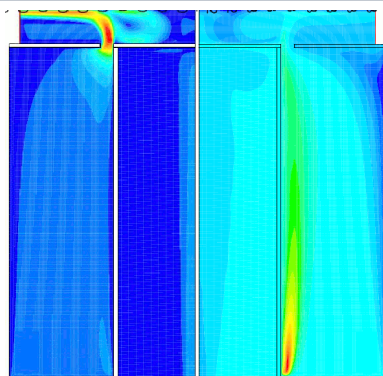
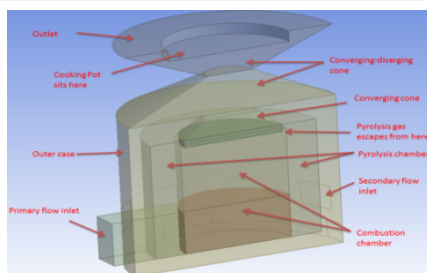


Sustainable Energy Cookstove Modeling and Design



**Sustainable Energy Cookstove:
Modeling and Design**



I am looking for 1-3 students to work on the modeling and design of cookstoves for use in developing countries. In recent years, there has been much interest in improving the design of biomass cookstoves. Improvements have focused on reducing harmful emissions and improving efficiency. We use numerical modeling to improve the heat transfer and fluid flow in the stove. We also consider factors that make the stove convenient to use, safe, and economical. We are starting to develop a collaboration with several Mexican universities and will probably have a Mexican student visiting our group and learning about our simulation techniques.

The project originated as part of a large project based in Soil and Crop Sciences, focusing on stoves that produce "biochar" or charcoal from biomass as a beneficial soil additive. We developed and tested a stove, both under laboratory conditions and under field conditions, in 30 households in Kenya. We also developed a model for the complex heat transfer, chemical reactions, and fluid flow in the stove. For 2017, we will probably focus on developing numerical models of alternative stove designs, e.g. the Patsari cookstove developed in Mexico.

The main activities will be numerical modeling with commercial software, but there may also be limited opportunities to perform experiments with a prototype cookstove. **I have a preference for students wishing to start a 2-semester project for Spring and Fall 2017.** Depending on the choice of project, work on the cookstove project can be used for M. Eng. or senior design credit, or as independent study (MAE 4900).

DESIRED QUALIFICATIONS: familiarity with heat transfer, fluid mechanics, thermodynamics, and basic chemistry. Desirable, but not necessary: experience with FLUENT, or CFX software, coursework in combustion or numerical modeling, knowledge of Matlab.

FOR MORE INFORMATION: e-mail Prof. Elizabeth Fisher, emf4@cornell.edu, 315 Upson Hall, 5-8309