A. JAMES CLARK SCHOOL OF ENGINEERING
DEPARTMENT OF FIRE PROTECTION ENGINEERING

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Research Opportunities in Computational Fire Modeling

The Department of Fire Protection Engineering at the University of Maryland, College Park (UMD), invites applications for **one Postdoctoral Research Associate** position and **one Ph.D. research assistantship** position in **computational modeling of Wildland Urban Interface (WUI) conflagrations.**

The spread of wildfires into WUI communities and their progression into urban fires has severely affected our communities, resulting in loss of life and extensive damage to properties and infrastructure. A key element in reducing these impacts and developing effective wildfire adaptation strategies is the ability to understand and accurately model wildfire spread to and within WUI areas. The main research goal for both roles is to enhance the mathematical representation of thermal degradation of solid fuel sources and flaming and smoldering combustion processes in fire simulators and to extend their use to modeling WUI fires at large spatial and temporal scales. The project will primarily contribute to the advancement of the open-source fire modeling ecosystems, such as Fire Dynamics Simulator (FDS), and apply the model to further our understanding of WUI fire spread using high-resolution physics-based simulations.

Job Description

- **Postdoctoral Position:** The successful candidate will collaborate with our team to develop a framework for urban fire modeling in FDS; more specifically, building a modular framework for constructing the computational domain and implementing a firebrand generation module in the solver. The efforts will involve the integration of large-scale datasets in a computationally efficient paradigm to enhance the applicability of the simulators in WUI fires.
- **Ph.D. Position:** The successful candidate will work within a collaborative team to implement a novel char oxidation and smoldering-to-flaming transition model and conduct high-resolution simulations and validation studies of WUI fire scenarios.

Qualifications

- Expertise in thermal degradation of solid fuel sources and combustion (reactive flow) modeling.
- Strong background in computational fluid and fire dynamics.
- Demonstrated expertise in fire modeling using **Fire Dynamics Simulator (FDS)**.
- Strong programming skills in **FORTRAN**; familiarity with **CUDA** is an advantage.

Appointment

- The postdoctoral position is an 18-month appointment, renewable for an additional 12 months based on performance and availability of funding.
- The Ph.D. position is a 36-month appointment, renewable until graduation.
- The Department of Fire Protection Engineering at UMD fosters interdisciplinary collaboration with academic and industry partners and is committed to advancing fire and wildfire science.

How to apply

Submit your application package via email before **October 15** to Prof. Arnaud Trouve (atrouve@umd.edu) and Ali Tohidi (atohidi@umd.edu).

Applications must include:

- A cover letter elaborating on your interests, expertise, and why you are a good fit.
- Your full CV, along with an official copy of your transcripts/degree
- Email addresses of at least three references.