Positions at Postdoctoral, Doctoral and Master's Levels

The Department of Fire Protection Engineering (FPE Dept) at the University of Maryland, College Park has openings for postdoc, PhD students and master's degree students, starting in Spring 2024 or Fall 2024. Candidates with research experiences or knowledge in combustion, fire tests and simulation, computer vision, or machine learning are preferred. The successful candidates will work closely with the PIs (Dr Shuna Ni, Dr Stanislav I. Stoliarov and Dr Arnaud Trouvé) on projects that meet the mutual interests of the PIs and the candidates. Interested students should contact Dr. Shuna Ni at shunani@umd.edu with "Ni Lab application" in the subject line. Please include a CV or resume, transcripts (both undergraduate and graduate), a brief statement of research experience and interests, and contact information of 2-3 referees in the email.

Our ongoing research efforts are centered on four key areas: fire forensics, fire safety of tall mass-timber buildings, warehouse fires and WUI fire resilience, as shown in Figure 1.

(a) Fire forensics

(b) Fire safety of tall mass timber buildings

(c) Warehouse fires

(d) WUI fire resilience

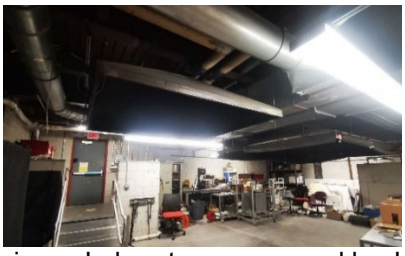
Figure 1 ongoing research efforts

The FPE Dept at the University of Maryland was established within the Clark School of Engineering in 1956. Our mission is to reduce the burden of fire loss on life and property by providing the highest quality of scientifically based education, research, and outreach in fire protection engineering, and in fire related safety, health, and environmental issues. The Department is highly research active. The FPE Department does world leading research in the areas of fire modeling, fire suppression, fire detection, flammability of materials, wildfires and fire hazards of energy storage systems, among others.

The FPE Dept has over 4,000 ft^2 of laboratory space specifically designed to study fire at a wide range of scales. All those lab spaces are shared among faculty members in the department. The lab facilities include:

- ***Fire Science Laboratory*** sponsored by Jensen Hughes, equipped with a milligram-scale flame calorimeter (MFC) and a ventilation system that can accommodate up to 1.5 MW fires (at peak) (as shown in Figure 2a);

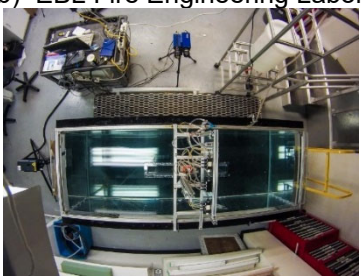
- ***EBL Fire Engineering Laboratory***, used to conduct research on material flammability (as shown in Figure 2b);
- ***Fire and Life Safety America Laboratory***, used to conduct research on the pyrolysis of combustible solids and flame–solid fuel interactions and to develop gas-fueled flames that emulate the burning of condensed fuels (as shown in Figure 2c);
- ***FM Global Fire Phenomenon Laboratory***, housing equipment for salt-water modeling of fire-induced flows and instrumentation used to measure soot oxidation rates in laminar diffusion flames (as shown in Figure 2d);
- ***James and Pamela Boyer Laboratory***, used for testing the efficiency of fire-suppressing clean agents (as shown in Figure 2e);
- ***Koffel Associates Fire Standards Laboratory***, housing a number of standard flammability assessment methods (as shown in Figure 2f);
- ***Dr. Harry E. Hickey Fire Suppression Laboratory*** sponsored by Jensen Hughes, used for characterizing fire sprinkler spays (as shown in Figure 2g).



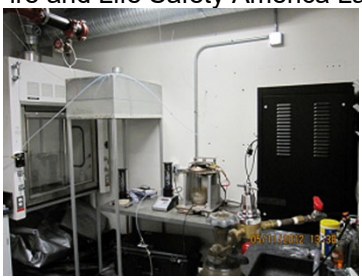
(a) Fire Science Laboratory sponsored by Jensen Hughes

(b) EBL Fire Engineering Laboratory

(c) Fire and Life Safety America Laboratory

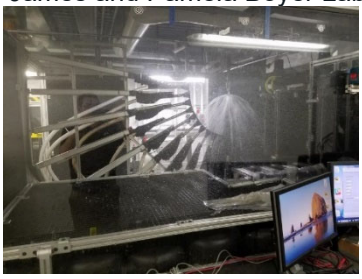


(d) FM Global Fire Phenomenon Laboratory



(e) James and Pamela Boyer Laboratory

(f) Koffel Associates Fire Standards Laboratory



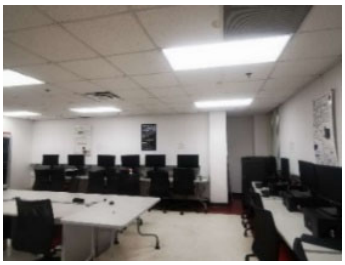
(g) The Dr. Harry E. Hickey Fire Suppression Laboratory, sponsored by Jensen Hughes

Figure 2 Fire labs in the FPE Dept at UMD

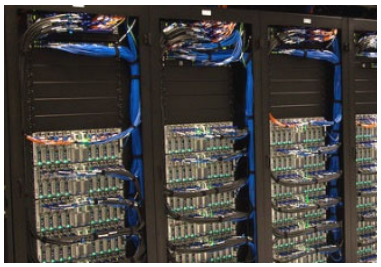
Computation powers are available for high-fidelity CFD-based simulations. The FPE Dept has a ***UL Fire Modeling Laboratory*** equipped with ***12 windows and 1 Linux workstations*** (see Figure 3a). Additional computational resources are available at the ***campus level*** (see Figure 3b):

- ***Zaratan***: the flagship cluster at UMD, intended for large, parallel jobs, housed off campus and maintained by the Division of Information Technology. It consists of over 380 nodes with dual socket (128 cores per node) AMD Milan processors. Twenty nodes also each contain four Nvidia A100 GPUs. All nodes have at least 512 GB of RAM, with six large memory nodes having 2 TB of RAM. All nodes have HDR-100 infiniband (100 Gb/s) interconnects, and there is 2 PB of fast BeeGFS scratch storage.
- ***Juggernaut***: An older experimental cluster, providing compute resources to some users who could not be added to the Deepthought2 cluster because of constraints of its data center, and a testing ground for the next cluster at UMD

Moreover, UMD has also access to ***15% of the new Bluecrab cluster*** housed at the Maryland Advanced Research Computing Center (MARCC), jointly managed by John Hopkins and the University of Maryland. Bluecrab is a high-performance computing Linux cluster corresponding to 650 compute nodes with a combination of dual socket (12 cores per node) Intel Xeon E5-2680v3 (Haswell) 2.50 GHz processors and Intel Ivy Bridge Xeon E7-8857v2 3.0 GHz processors. Most nodes have 128 GB of RAM. In addition, there are 50 nodes with dual Nvidia Tesla K80 GPUs and 50 nodes with 1 TB of RAM. The total number of cores is over 19,000. All nodes have FDR infiniband interconnects (56 Gb/s), and there is 2 PetaBytes of Lustre file storage. Bluecrab is rated at 900 TeraFlops.



(a) UL Fire Modeling Laboratory



(b) Zaratan and Juggernaut clusters at UMD and Bluecrab cluster at MARCC

Figure 3 Computing sources