



### PROGRAM

3:00 pm - 3:50 p.m. Lecture  
3:50 pm - 4:00 p.m. Q&A and Discussion  
3:50 pm – 4:00 p.m. Refreshments

### ABSTRACT

The prediction of the behavior of fires, which has been traditionally addressed through experiments, is currently being tackled by computer modeling. However, both approaches are characterized by several challenges, which must be carefully considered and still need to be overcome. On the modeling front, FM Global has recently committed to a development effort based on an open-source platform (OpenFOAM®). This activity relies on an array of co-operations with academic institutions and other laboratories and is focused on two main tasks: 1) the selection of a robust numerical scheme for fire simulations; and 2) the establishment of the appropriate physical models to simulate the phenomena that are important in fires. Flame radiation, fuel pyrolysis, water spray interaction with hot gases and burning surfaces are all being addressed at this point. In part due to the fact that large-scale experiments will have to provide the basis for validation of the model predictions, much attention has been recently devoted to studies of the factors, which affect test repeatability. In particular, the effect of ambient temperature and relative humidity on fire growth in cartoned commodities has been analyzed. Additional work is currently looking into methods to obtain more information on fire behavior from the multitude of measurements typically made during a fire test. One such application is the routine extraction of heat release rate values from ceiling temperature data. Other applications in data analysis will also be discussed in the seminar.

### SEMINAR TITLE

## “Computer Modeling and Experimental Challenges of Large-Scale Fire Tests”

### SEMINAR SPEAKER

## Dr. Francesco Tamanini

Consulting Research Scientist  
FM Global, Research Group

### BIOGRAPHIC PROFILE



After coordinating for several years FM Global's research activities in the area of explosions, Dr. Tamanini moved in 2004 to the Consulting Research Scientist position. In his current role, he provides support to the Manager of Research, and to the entire scientific and engineering staff, on issues spanning all research topics of interest to FM Global. They include: fire testing; material flammability; CFD modeling of fires and explosions; impact of natural hazards (wind, flood, earthquake) on property; risk assessment; equipment reliability; and material damage. In addition, Dr. Tamanini has contributed original work in several technical areas:

- extinguishment of fires by water sprays;
- computer modeling of turbulent buoyancy-controlled flames;
- measurements of the flammability properties of materials;
- large-scale experiments on the combustion behavior of hydrogen releases into confined volumes;
- definition of the reactivity characteristics of silane;
- vent sizing requirements for explosions in layered vapor/air mixtures;
- protection requirements for storage of cellulose nitrate film; and
- various other problems of dust and gas explosions.

Franco started working at Factory Mutual Research in 1974 after receiving a Ph.D. in applied physics from Harvard University. He also holds MS degrees from the California Institute of Technology and the Politecnico of Torino in Italy. He has served as the Chairman of the Eastern States Section of the Combustion Institute, is the 1996 recipient of the Bill Doyle award of the AIChE, and has published numerous refereed papers and technical reports.