

Graduate Research Assistantships in the Firelab 2013

Dave Martell and Mike Wotton are seeking graduate students to work on a number of fire related research topics in the Firelab (<http://www.firelab.utoronto.ca>). Dave Martell (david.martell@utoronto.ca) specializes in forest fire management systems and Mike Wotton (mike.wotton@utoronto.ca) in fire behaviour. We are seeking graduate students and post doctoral researchers that are interested in becoming involved in the research projects described below. If you are interested, please email a copy of your curriculum vitae and a transcript of your grades to one of us.

Forest fuels and fire behaviour

Mike Wotton

Forest fire managers in Canada (and in numerous countries around the world) evaluate fire potential in their forest environment on a daily basis with outputs from the Canadian Forest Fire Danger Rating System (CFFDRS). This system includes weather-based models of forest fuel moisture, along with models for fuel type explicit elements of fire behaviour such as a fire's spread rate and its intensity. Currently the Canadian Forest Service is developing a next generation of many of the models in this system.

Mike Wotton is seeking graduate students to be part of this major effort to develop a new generation of the CFFDRS for both field-based and modelling research projects. Ongoing research projects are related to forest fire behaviour and fire danger rating in general and include fuel moisture prediction, fire ignition and occurrence probability modelling, fuels characterization and rate prediction. Ideal students would have good quantitative skills (e.g., some ability with statistics, computer programming) and some experience working either in the wildfire management community or on field-based research projects.

Statistical analysis of forest fire processes

Dave Martell & Mike Wotton

We have collaborated with several Canadian forest fire management agencies to acquire and refine several large fire, weather and forest composition datasets and we have developed collaborative relationships with statisticians and others to develop and use new statistical methods to model many important fire processes (e.g., daily fire occurrence prediction, spatial and temporal variation in fire activity, the impact of climate change on fire processes). We are seeking graduate students that wish to become involved in those projects, either in the Firelab at Faculty of Forestry at the University of Toronto or one of the other universities with whom we collaborate. Practical fire experience would be a definite asset.

Mathematical modelling of forest fire initial attack systems Dave Martell

Most forest fires are contained at very small sizes but during some days, particularly hot, dry windy days when many fires are reported, the initial attack system can become congested, initial attack can be delayed, and some fires may escape initial attack and become large destructive project fires. Congested initial attack systems can be modelled as queueing systems with fires as “customers” that wait in the queue until they are “served” by airtankers. The longer the fires wait the larger and potentially more destructive they become. Fire managers need to balance the cost of airtankers with the benefits of shorter response times. Dave Martell is looking for Masters students with quantitative expertise (e.g., undergraduate courses in mathematics, statistics, geographic information systems and computer programming) and post doctoral researchers (in operations research) that are interested in participating in statistical analysis of initial attack system data and the development and field testing of computer-based queueing models of initial attack systems. Practical fire fighting or urban emergency response systems experience would be a definite asset.

Fire suppression resource sharing models Dave Martell

Forest fire management agencies reduce their costs by participating in mutual aid agreements that facilitate the transfer of aircraft, fire fighters and other suppression resources from those that are experiencing low hazard conditions to those that are confronted with large numbers of fires that are being driven by extreme burning conditions. Dave Martell is seeking Masters students with quantitative expertise (e.g., undergraduate courses in mathematics, statistics, geographic information systems and computer programming) that are interested in participating in the development of strategic planning models that fire managers can use to help determine how they can achieve an appropriate balance between large investments in aircraft and fire fighter hiring and sharing their fire suppression resources with other agencies.

Forest management planning under uncertainty Dave Martell

Forest managers evaluate strategies and develop plans for planning horizons that span more than 100 years and when they do so, they must account for the possibility that parts of the forests they are managing may be “disturbed” by fire, insects or disease. Dave Martell is seeking graduate students with quantitative expertise (e.g., undergraduate courses in mathematics, statistics and computer programming) and post doctoral researchers (in forest management or operations research) that wish to develop statistical models of such disturbance process and/or incorporate such models in mathematical programming models of managed forest landscapes. Practical forest management experience would be a definite asset. For further information contact Dave Martell.

Number of Positions Available in the Firelab: 2-3 MScF's and 1-2 PhD's