THE 3RD INTERNATIONAL
smoke
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RALEIGH, NORTH CAROLINA AND UNIVERSITY OF CALIFORNIA, DAVIS, USA

The workshops will take place on Monday, April 20, the day preceding the 3rd International Smoke Symposium (ISS3).

The purpose of the workshops is to provide a forum for researchers and practitioners in wildland fire, smoke management, public health, and air quality management to discuss and exchange interests on defined topics. We view these workshops as an opportunity for knowledge and technology transfer.

Registration for the workshops is $20 for half day and $40 for full day.

Workshop Schedule - Raleigh				
	Room 1	Room 2	Room 3	Room 4
8:30 - 12:30	Smoke and Health Research: The Years Ahead	How Does Community Capacity Influence Preparedness, Response, Recovery, and Resilience to Smoke?	Smoke Modeling from Forest to Plume: Integrated Modeling Workshop for Smoke Management	Incorporating Smoke Impacts into Air Quality Forecasting
1:30 - 5:30			New Generation Satellite Products for Operational Fire and Smoke Applications	Wildfire Detection and Dispatch – Case Studies and Enabling Technologies

Full Day 8:30-5:30
Smoke and Health Research: The Years Ahead
Instructors: Sarah Henderson, Senior Scientist, BC Centre for Disease Control
Wayne Cascio, US Environmental Protection Agency
Fay Johnston, University of Tasmania
Ana Rappold, US Environmental Protection Agency
Bonne Ford, Colorado State University
Ian Gilmour, US Environmental Protection Agency

The objective of this workshop is to develop a consensus on the most pressing research gaps related to wildfire smoke, exposure assessment, and health effects. During the morning session, each of the instructors will give a 20-minute presentation on where they feel the science needs to go over the next 5-10 years. This is NOT a review of work that has already been done but brainstorming around the questions we most urgently need to answer in the years ahead. All of the instructors have been working in the field of wildfire smoke and health for several years and have published multiple peer-reviewed papers on the topic, which gives them important insight into the past, present, and future research areas. During the afternoon session, the instructors and participants will decide on 2-4 research topics based on the morning presentations and will break into collaborative groups to workshop study designs and

protocols for upcoming funding opportunities. This workshop will allow new investigators in wildfire smoke and health to work with established investigators, thereby growing research capacity and opportunities for funding success.

Full Day 8:30-5:30
How Does Community Capacity Influence Preparedness, Response, Recovery, and Resilience to Smoke?
Instructors: Christina Baghdikian, US EPA Office of Research and Development
Susan Lyon Stone, Senior Environmental Health Scientist, EPA's Office of Air Quality Planning and Standards
Dr. Mary Clare Hano, Social Scientist, U.S. EPA's Office of Research and Development
Dr. Ana Rappold, Statistician, EPA's Office of Research and Development

Wildfire smoke is impacting communities across the country in a more intense, more frequent pattern. When a community faces significant smoke intrusion, the individuals responsible for coordinating wildfire smoke response often have various other full-time environmental public health roles in their community. Smoke-Ready Communities is a two-pronged program and research project exploring ways to help these individuals build capacity within their community for effective smoke response. This workshop will: introduce the Smoke Ready Communities program; provide an overview of the underlying community capacity research approach; facilitate discussion about participant communities' needs; and, walk participants through the various Smoke-Ready materials and process for their community.

Morning 8:30-12:30
Smoke Modeling from Forest to Plume: Integrated Modeling Workshop for Smoke Management
Instructors: Susan Prichard, Susan O'Neill, Roger Ottmar, Jim Cronan, Anne Andreu, Paige Eagle

Smoke emissions from prescribed fires and wildfires are dependent on a number of variables including area burned, pre-burn fuel loading and arrangement, fuel consumption, fire behavior and plume dynamics. Dispersion and concentrations of the smoke from prescribed burns depends on the rate of emissions and heat release, weather and terrain. Each of these variables in predicted emissions is associated with uncertainty, and of these, estimating fuel consumed within burned areas has the potential for particularly high error propagation in estimated emissions. In addition to errors in quantifying or estimating total fuel consumption, determining the amount and type of fuel consumed in flaming, smoldering and long-term smoldering is critical for predicting downwind smoke impacts such as nighttime inversions and intrusions into communities. Finally, the selection of meteorological domain is critical in dispersing smoke downwind, as well as how emissions are input into the meteorological system via plume rise and vertical allocation underneath plume rise.

Morning 8:30-12:30
Incorporating Smoke Impacts into Air Quality Forecasting
Instructors: Patrick Zahn, Lead Air Quality Forecaster, Sonoma Technology, Inc
Marcus Hylton, Air Quality Forecaster, Sonoma Technology, Inc
Jeff Beamish, Air Quality Forecaster, Sonoma Technology, Inc
ShihMing Huang, Air Quality Scientist, Sonoma Technology, Inc

Air quality impacts from wildfires, prescribed burns, and agricultural burns have become an increasing concern for air quality forecasters, and smoke impacts present a particular challenge when trying to deliver accurate, timely forecasts. In this workshop, meteorologists and air quality forecasters from Sonoma Technology discuss practical approaches to incorporating smoke impacts into daily ozone and PM2.5 forecasts. We share tools and techniques to predict smoke-enhanced air pollution, including trajectory analyses, satellite imagery, and air quality forecasting models. We also present case study examples of smoke impacts from local fires, as well as long-range smoke transport leading to exceptional air quality events. In particular, we discuss localized burning in the Imperial Valley in southern California, prescribed burn impacts in the Flint Hills region of Kansas, smoke impacts on ozone in Louisiana, impacts from recent fires in northern California, and long-range smoke transport into Ohio. Additionally, we discuss challenges in communicating smoke impacts to air quality agencies and the public, using examples from residential wood burning and prescribed burn decision support systems.

Afternoon 1:30-5:30
New Generation Satellite Products for Operational Fire and Smoke Applications
Instructors: Amy K. Huff, Senior Research Scientist, IMSG at NOAA/NESDIS/STAR
Shobha Kondragunta, NOAA/NESDIS/STAR

In this half-day workshop, participants will learn how to utilize the new generation of geostationary and polar-orbiting satellite products to forecast, monitor, and track the impacts of wildland fires and smoke. The polar-orbiting satellites SNPP, NOAA-20, and S5P and the geostationary satellites GOES-16 and GOES-17 are providing revolutionary observations of fires, aerosols, and trace gases with unprecedented resolution and accuracy. Through case study examples, participants will become familiar with the relevant satellite products for fires and smoke, including color imagery, aerosol optical depth (AOD), aerosol detection, fire characterization, carbon monoxide (CO), and nitrogen dioxide (NO2). Topics will include the status and specifications of the available products, accessing near real-time imagery from NOAA's AerosolWatch and JSTAR Mapper websites, and interpreting data and imagery with a focus on air quality and visibility.

Afternoon 1:30-5:30
Wildfire Detection and Dispatch – Case Studies and Enabling Technologies
Instructor: Gavin Hough, Developer and Founder – EnviroVision Solutions Inc.

By using remote access to operational detection centres, several case studies demonstrating detection examples and key design concepts will be explained. Machine learning, and other vision system concepts will be detailed in such a way as to provide improved spatial and situational awareness. The user experience for operators and dispatch managers will be shared and user feedback outlined.

The impact of multispectral imaging on detection range and sensitivity will be shown using test fires and extensive vegetation fire data. Workflow for system operator and monitoring fires from ignition to several days after the wildfire being extinguished to check for holdover fires will be shown.

Integrating early detection with rapid response will be showcased for active wildfires using web-based dispatch, mobile applications and specific workstations for wide area geo-referenced surveillance systems.