

FIRE PATTERNS INDICATORS

## Inquiry into Wildfire Pattern Indicator Interpretation Integrity

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### SHORT BIO(S)

*Chris Warren* – Mr. Warren is currently the Wildfire Mitigation Specialist for the Arvada Fire Protection District and Wildfire Chair of the Colorado Chapter of IAAI. Mr. Warren's background includes over 8 years in wildfire suppression and fuels management, from fuels crews to hotshots (type I initial attack crews). He began investigating wildfires in 2013, with investigations such as the Ft. McMurray Wildfire, Alberta, CA, 2016, September 2020 Wildfires, of western Oregon, USA, 2020, and Marshal Fire, Louisville, Colorado, USA, 2021. He has an Associate's from Boise State University and a Bachelor's in Fire Science and Safety Engineering from Eastern Kentucky University.

*Scott Plumer* – Mr. Plumer is a Deputy Fire Marshal for the Arvada Fire Protection District. He is also a contract instructor for the National Fire Academy in the fire investigation curriculum. He has over 15 years of experience in the fire protection industry. His experience includes working as an engineering consultant and then a fire investigator for an insurance company. He has a Bachelor of Science in Fire and Safety Engineering Technology from Eastern Kentucky University and a Master of Science in Risk Management from Florida State University. He is an IAAI-CFI, NWCG INVF, and a licensed fire protection engineer.

### WORKSHOP DESCRIPTION

Wildfire origin and cause investigations are intricate endeavors within the already complex practice of fire investigations. While wildfire investigators are regularly identifying correct areas of origin, through the practice of interpreting fire pattern indicators (FPIs), current and future wildfire investigations could benefit from a more comprehensive understanding of the physical and chemical changes that occur to artifacts in the natural environment as wildfire progresses past these artifacts.

A recent inquiry into the investigator's capacity to correctly determine wildfire origins based upon conventional understanding of FPIs has challenged the accuracy of FPI interpretation. These findings support the need for enhanced understanding of the change's artifacts experience as an effect of wildfire movement, how individuals interpret and document FPIs, and the relationship in between these pieces in correctly determining and presenting an origin area.

In March of 2025, a prescribed burn was held at the Rocky Mountain Arsenal National Wildlife Refuge outside of Denver, Colorado, with four research plots of similar dimensions established and burned. A total of 50 artifacts within these plots were collected after the burn and evaluated by 8 investigators of different backgrounds, with the intention of inquiry into FPI development, and the understanding of this process by the community of investigators.

The first hour of this workshop will begin as a lecture, presenting the full process of the inquiry, its findings, and discussing the lessons learned in the application of the process. The presentation will then end by presenting the findings and conclude by focusing on areas where the need for improvements was identified.

Following the conclusion of the presentation, attendees will engage in a short open forum discussion moderated by the instructor. The open forum will use participant takeaways

from the lecture, identifying areas of: additional needed research on fire pattern development, training needs for the community of investigators, and process systems for distributing knowledge identified by the attendees. Attendees will then form into breakout groups based on these categories, in which they feel best suited to support the improvement of wildfire investigations.

The groups will discuss plans of action, and collaboration based on what they learned during the workshop, and what they will take back to their home areas to begin supporting the advancement of the understanding of FPI development. The workshop will then conclude with groups summarizing what they learned, what they hope to take home, and a framework for establishing a contribution to one of the three areas of research, training, or process.

In summary, the intent of this research was to establish “What questions do we need to be asking to improve wildfire investigations?”, present those findings to the international community, then support the attendees and build connections, responsible for returning to their home units and simultaneously engage in similar activities in global fuel types and ecologies. It is the ultimate goal of this workshop to initiate an international community collaborating with each other to collectively build a universal understanding of FPI development and the ecosystems that influence them. As such, the target audience is investigators, researchers, and training personnel. In summary, the intent of this research was to establish “What questions do we need to be asking to improve wildfire investigations?”, present those findings to the international community, then support the attendees and build connections, responsible for returning to their home units and simultaneously engage in similar activities in global fuel types and ecologies. It is the ultimate goal of this workshop to initiate an international community collaborating with each other to collectively build a universal understanding of FPI development and the ecosystems that influence them. As such, the target audience is investigators, researchers, and training personnel.

Keywords: FPI; Fire Pattern Indicator; FPI Development; Fire Pattern Reliability; Wildfire investigation; Documentation; Training.

#### More information

Length of the workshop:	3 Hours
Number of participants*:	N/A
Special facility needs:	LCD Projector

\* Workshops with fewer attendees than the minimum number may be canceled at the discretion of the conference organizers.

#### References

- Parker, Keith, and Vytenis Babrauskas. "Validation of NWCG wildfire directional indicators in test burns in coastal California." *Fire* 7, (2023). <https://www.mdpi.com/2571-6255/7/1/5>
- National Wildfire Coordination Group. "Guide to Wildland Fire Origin and Cause Determination, PMS-412" (April 2016) <https://firewiselearningacademy.com/wp-content/uploads/National-Wildfire-Coordinating-Group-Guide-to-Wildland-Fire-Origin-and-Cause-Determination.pdf>