



### W19 The Evolution of Fire Investigation From the Perspective of Science: Why Science Matters in the Search for Justice

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After attending this presentation, attendees will have an understanding of how: (1) past anecdotally based methods resulted in potentially erroneous convictions; (2) scientific research discredited those methods; (3) applicable standards have evolved as a result; and, (4) science-based research in many disciplines continues to improve our understanding of fire science and its proper application in fire investigation.

This presentation will impact the forensic science community by explaining the importance of empirical scientific research as well as how and why the results of such research must be applied when investigating fire scenes, analyzing fire debris and other evidence, and crafting valid conclusions in any investigative discipline.

Numerous organizations, academics, and fire investigators have contributed to an ever-growing body of empirical research in fire science, some of which contradicted many previously accepted anecdotally derived fire behavior beliefs; however, this scientific information, even when available for use in fire investigations, has not always been applied nor always accepted in contemporary court proceedings. This workshop will look at the methods, processes, and reasoning used in past fire investigations and compare them to countervailing science-based analyses elucidated, primarily, during post-conviction appeals. Faulty fire investigations are not limited to criminal matters; they are equally likely to affect insurance-related civil litigation; however, criminal court records and information are more accessible and, since the fire investigation techniques are the same, this workshop uses mostly (though, not exclusively) criminal case examples.

To illustrate the effect that empirical, scientific research has had on fire investigations, the fatal arson conviction of Adam Gray will be examined.<sup>1</sup> Gray was arrested in March 1993 following a fire in the back of a house that killed two people. Investigation indicated the fire had been intentionally set and there was a confession from Gray. Two fire investigators found alligator charring and deep burn patterns at the scene and concluded that was evidence of a hot fire set with an accelerant. A milk jug found in the alley behind the home was believed to contain the accelerant. A gas station clerk said Gray bought gas shortly before the fire. In his confession, Gray admitted purchasing gasoline and dousing the enclosed second floor back porch and stairs. Gray was convicted of arson and murder; he was 14 years old. On appeal, Gray contended that his conviction was based on a coerced confession, faulty laboratory analysis, and flawed fire behavior conclusions. Despite the proffer of research-based evidence, a trial-level judge denied Gray's motion for a new trial. The charges against Gray were only dropped in May 2017 after prosecution and defense jointly sought dismissal from an appellate court.<sup>2</sup>

These contrasts will be further illustrated by examining other fatal arson convictions subsequently affected by science-driven changes, including Angela Garcia, Katherine Bunch, Earnest Ray Willis, and Han Tak Lee.<sup>3-6</sup>

Presenters will also examine the following: how science-based research significantly altered fire science concepts and fire investigation; how the research is driving standards development by the National Fire Protection Association (NFPA), the American Society for Testing and Materials (ASTM), and others; the role of certifying organizations, such as the International Association of Arson Investigators (IAAI) and others, in promoting acceptance of science-based concepts; recent and on-going research using computer simulation, electron microscopy, Gas Chromatography/Mass Spectrometry (GC/MS), and real-world live-fire experimentation by Underwriters Laboratories, the Bureau of Alcohol, Tobacco, Firearms and Explosives, and other entities; human bias issues affecting cause determinations and their use in court proceedings; and contemporary issues of reliability, validity, and accuracy of fire investigations and their acceptance in court proceedings.

Since trial court judges are evidentiary gate keepers, determining, as a matter of law, who is qualified to be an expert witness and whether an expert's opinion is admissible, throughout the workshop speakers will explore questions pertaining to admissibility: Should fire investigators be subjected to *Daubert* challenges? What qualifies a fire investigator to be considered an expert witness? Are fire investigators "forensic science practitioners" or "forensic scientists"? Does it matter? What constitutes an admissible origin and cause determination?

#### Reference(s):

1. *People v. Adam Gray*, No: 94-CR-279301, Cir. Ct. Cook County, Ill., 2017.
2. Joint Motion to Vacate Convictions and Enter an Order of *Nolle Prosequi*, *People v. Gray*, No 16-3218, Ill. App. 1<sup>st</sup>, 2017.
3. *Ohio v. Garcia*, CR-00-387760-ZA, Ct. C.P. Cuyahoga County, 2013.
4. *Bunch v. State*, 964 N.E.2d 274, Ind. Ct. App., 2012.
5. *Willis v. Cockrell*, No. P-01-CA-20, (W.D.Tex. Aug. 09, 2004).
6. John J. Lentini, A Calculated Arson, *49 Fire & Arson Investigator* 2, April 1999, pp. 20-25.

#### Fire/Arson Investigation, Wrongful Convictions, Fire Science Research