W18 The Opiate Crisis, Dirty Bombs, Big Data/Big Problems, and Driverless Cars: On the Leading Edge of Forensic Science — 2017 Theoretical Forensic Sciences "Think Tank"

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The goal of this presentation is to describe how new developments might impact forensic scientists in their work. Practical examples will be presented on lab automation, driverless cars, designer drugs, nuclear forensics, cybercrime, and big data.

A wide variety of developments that will soon impact forensic science have been identified within the Think Tank Committee of the Forensic Sciences Foundation, Inc. This presentation will impact the forensic science community by providing an overview of some of the new developments in forensic science and by opening a forum for the discussion of issues that arise regarding such developments.

The amount of data that is available from digital investigation and from sensors is rising each year and the question is if a statistical analysis of this data can be presented in court. Biometric algorithms are improving and analyzing large amounts of video and images in combination with location data and other data available provide the possibility to make summaries of the data which can be presented in court. When applying these methods, the users should also be aware of the limitations and the error rates of the algorithms used. In addition, the use of Bayesian conclusion scales are under discussion.

In this day with genetics, you can learn your ethic background, find your relatives, even learn about your predisposition to diseases right from your own home. Over two million people have paid to include their DNA information in a website's database. While many have concerns about law enforcement databases and the rights to privacy of their genetic information, others are willingly mailing their DNA to these private companies. What is the difference in these databases and how are they secured and monitored? There are numerous concerns and questions that should be addressed and discussed to inform the public about putting their genetic information "online."

We see the developments of UAVs and drones and the forensic issues with finding digital traces as one of the topics. The driverless car is also a reality and it is unknown how these cars and their drivers will perform in the real world.

The investigation within a Chemical, Biological, Radiological, and Nuclear (CBRN) crime scene and the interrogation of CBR agents present a variety of problems and are another important issue or development. Primary amongst those at the scene is an intense degree of political scrutiny and a high thermal burden. How do you accurately take high-value samples when you are in a Level A "spacesuit"? How do you know where they are and

what should you prioritize in the 20 minutes of air that you will have on the scene? The European Commission Generic Integrated Forensic Toolbox (GIFT) is answering these questions and can share some of the data with you.

Another issue is designer drugs. Designer drugs are novel compounds selected for manufacture and distribution based on their pharmacological effect and questionable legal status. Starting in 2008, enterprising chemists began synthesizing and selling novel drugs whose structures were taken from or based on the pharmaceutical scientific literature and patents. For the most part, the drugs had never been evaluated or tested on humans or were never brought to market because of potentially dangerous or unknown side effects resulting in many intoxications and deaths. Testing for these drugs is often a challenge as analytical standards are not available and the substances are not in shared or commercial databases or libraries. Metabolic studies have not been performed, so frequently toxicologists do not know what metabolites to test for and fail to recognize them even when they are present. Additionally, the designer drug market turns over very quickly with many novel toxic substances appearing and disappearing from online sales within six to nine months. To keep up, laboratories need be innovative in their approach to monitoring the market through drug user intelligence, peer-reviewed literature, building in house libraries and databases, and many other channels of drug intelligence in anticipation of possible new threats.

Forensic Science, New Developments, Cybercrime