THE FORENSICS REPORT

A SCHOLARLY NEWSLETTER SHOWCASING MARYLAND FORENSIC SCIENCE STUDENTS

In This Issue:

Graduate students in the M.S.F.S Forensic Biology program at Towson University learn how to use robotics to extract DNA from evidence samples.

Welcome to the first issue of The Forensics Report. The Report has been commissioned by the Forensic Educator's Committee, a part of the Center for Forensic Excellence, to showcase the exceptional research and educational experiences forensic students throughout the State of Maryland have been engaged in. The purpose of the Report is to further the mission of the Forensic Educator's Committee by giving Maryland forensic students additional opportunities for writing, research, and publication. This newsletter will highlight thesis research, coursework and special projects completed by Maryland forensic students over the past year. A special thanks to all students and faculty who submitted content for the first issue of the Report.

The persistence of 2,4,6-trinitrotoluene (TNT) on damp metal and plastic evidence.

by Nicole Heil, M.S.F.S.
Stevenson University

Explosives have the potential to cause mass casualties, and the ability to identify trace amounts of explosive can allow investigators to determine who could have created the explosive device used in the attack. Different weather conditions have been shown to affect the persistence of trace explosive evidence collected from the crime scene. The objective of this research was to assess how long trace amounts of 2,4,6-trinitrotoluene (TNT), a commonly-used explosive, could be identified under dry weather, mist, and light rain. *Cont'd on next page.*

An explosion caused by TNT (independent.co.uk).

Brutal Baltimore: The Murder of Sister Catherine Ann Cesnik

Cold Case Analysis By Joshua Ziesel
Loyola University

Sister Catherine Ann Cesnik

In recent years, forensic science has developed and improved in ways that make findings more conclusive. Additionally, new technologies can reveal information that was previously invisible or unknown. The unsolved 1969 murder of Sister Catherine Ann Cesnik in Baltimore, Maryland, popularized by the Netflix series "The Keepers", was reviewed to determine what could have been done differently to get answers and a conviction. The findings of the initial investigations as well as subsequent evidence from its reopening in 1994 were analyzed and new approaches to solve the case through modern forensic advances were reviewed. Sometimes evidence from cold cases can be re-analyzed using modern techniques to give investigators insight into who may have committed the crime. Unfortunately, due to a number of factors such as a press strike in early 1970, incompetence, and biological decomposition, much evidence has been lost. Fingerprints, trace evidence, and foliage from Sister Catherine's vehicle, the last known place she was alive, were not collected or analyzed. While suspects were questioned, no searches were completed to find the murder weapon which could have linked a suspect to Sister Catherine using DNA analysis. Had officials conducted initial investigations more efficiently and preserved any biological evidence that was collected, perhaps modern forensics could help finally resolve the mystery of Sister Catherine's murder.

This cold case analysis was completed as part of the course "Poe, Holmes, and the Evolution of Forensic Science" taught by David Rivers, Ph.D. at Loyola University.

Obtaining DNA from a P30 semen serological assay card

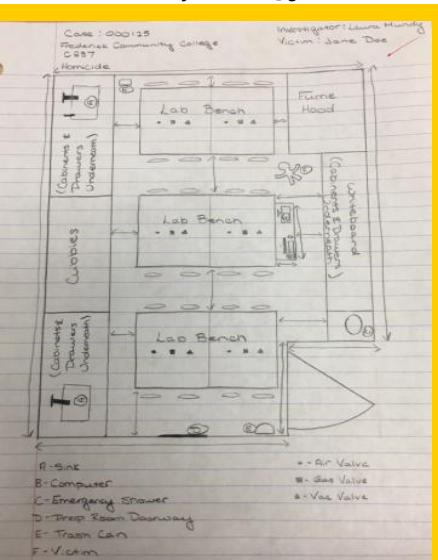
By Taranjit Athwal, M.S.F.S.
Stevenson University

A high number of sexual assault cases are submitted to forensic laboratories each year, resulting in the need for a fast and simple confirmatory test for the identification of semen. The confirmatory test most frequently used by crime labs is the P30 immunoassay. Often times, samples collected from a crime scene are not of enough quantity or quality for all tests that need to be performed. If multiple tests could be done on one sample cutting, this would conserve vital evidence. The purpose of this study was to determine whether a DNA profile could be obtained from the sample well of a p30 test card (pictured to the left). A semen sample was purchased from a sperm bank and diluted. The dilutions were run on p30 test cards, all giving positive results for the presence of semen. Then DNA was isolated from the sample well of the card. It was found that the 1:20, 1:50, and 1:1000 dilutions all produced a DNA profile. The DNA profile obtained from the 1:20 and 1:50 dilutions was consistent with the original male profile. Some dilutions gave a mixture of DNA, indicating that there is a possibility of contamination of the cards, although further studies would need to confirm this. In conclusion, this study demonstrated that it is possible to obtain a DNA profile from the sample well of a p30 serological test card.

This research was completed under the supervision of Alison Shao at Stevenson University. Please send questions regarding this research to taranjit.athwal@gmail.com.

Locus	Known Male DNA Profile	1:50 DNA Profile
D8S1179	10	--
D21511	30	--
D7S820	9	--
CSF1Po	10, 11	--
D3S1358	14, 19	14, 19
THo1	9	9
D13S317	11	11
D16S539	12, 13	12, 13
D2S1338	19, 22	--
D19S433	13	13
vWA	15	--
TPOX	9	9
D18S51	17, 20	--
Amelogenin	XY	--
D5S818	9, 11	--
FGA	22, 24	--

DNA profile of known semen sample and 1:50 dilution from sample well of P30 card.



Laura Mundy created a rough mock crime scene sketch for the Forensic Biology course offered at FCC.,

Forensic Investigation of Water Chemicals at FCC

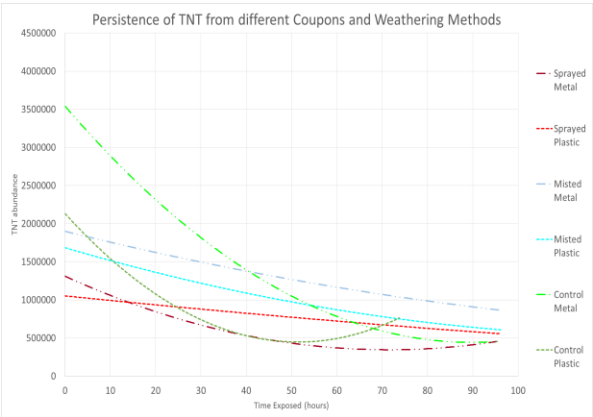
By Godfrey Ssenyonga
Frederick Community College (FCC)

Water is essential to human health. Any slight trace of chemicals in water could lead to serious health issues. During a series of meetings both at the college and with the community, students raised concerns about potential chemical contamination of water due to local environmental factors and run off from Fort Detrick. In this forensic investigation, we tested water samples at FCC for possible chemical contamination. The goal of this investigation was to analyze the margin of safety and target possible chemical hazards in the FCC drinking water. Water samples were collected over a period of two months and tested using a water analysis testing kit. Results were compared to normal ranges published by the Environmental Protection Agency as well as to water testing results published by Frederick County. The data collection resulted in no contamination, and we concluded that the water at FCC was safe to drink. An ongoing effort of water testing will be continued.

This research was completed under the supervision of Dr. Judy Stavely at Frederick Community College (FCC). Please send questions regarding this research to gssenyonga@frederick.edu.

Explosives (cont'd from Page 1)

To conduct this research, pieces of plastic and metal were spiked with TNT and weathered in one of the three weather conditions for five days. Samples were extracted at different time intervals over the five-day period and analyzed with Gas Chromatography/ Mass Spectrometry (GC/MS). This research also conducted a preliminary investigation comparing the use of acetonitrile and acetone as extraction solvents for TNT. The results highlighted that TNT can be detected for all five days under mist and simulated rain and that TNT can also be identified from dry metal for five days. The results also showed that the amount of TNT tended to decrease under all weathering conditions and that more TNT could be detected from the car metal than the plastic. Finally, the results comparing acetonitrile and acetone indicated that acetonitrile is not a superior solvent for TNT extraction when compared to acetone.



TNT persistence for all coupon types and weathering conditions.

This research was completed under the supervision of Stanley Ostazeski, Ph.D. at the Forensic Analytical Center in Aberdeen Proving Ground. Please send questions regarding this research to mnheil13@gmail.com.

If you have any questions or comments regarding The Forensics Report, or if you would like to submit an article for the next Report, please contact Alison Shao at ashao@stevenson.edu. For more information on the mission and services of the Forensic Educator's Committee and the Center for Forensic Excellence, please visit http://www.stevenson.edu/online/academics/graduate-programs/center-for-forensic-excellence/