

Professional Review and Commentary

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Forensic Science Review's Professional Review and Commentary section highlights contemporary issues and events in the profession of forensic science. To contribute updates or commentary, please contact John Collins at the RTI International Center for Forensic Sciences at +1 919 597 5157 or jcollins@rti.org.



FORENSIC SCIENCE NEWS AROUND THE WORLD

Australian Forensic Scientist Dies in Plane Crash — *Australia*

The tragic death of Professor Ross Vining, head of Forensic Science for South Australia, came as a shock to justice authorities. Vining was killed in a light aircraft crash on his way to Queensland to view a total solar eclipse. Vining reportedly was the pilot and only passenger of his own seaplane, which he built seven years ago. Highly respected and accomplished in the forensic science community, he leaves behind a wife and son.

American Forensic Chemist Faces Criminal Charges — *United States*

The discovery and aftermath of extensive misconduct on the part of a forensic drug chemist at a non-accredited public health laboratory in Jamaica Plain, MA, has led to an investigation by the state. Massachusetts Attorney General Martha Coakley is reported to have filed criminal charges against chemist Annie Dookhan for falsifying her credentials and obstructing justice. Governor Deval Patrick has requested \$30 million USD from lawmakers to cover the initial costs and to hire new chemists.

The events in Massachusetts may prompt serious discussion about the hiring and training of forensic scientists, to include the development of their ethical and professional judgment. News coverage of the situation in Massachusetts included video of a handcuffed Dookhan being led to a police car. Hopefully, scandals of this sort will remain remarkably rare, but they can serve as a reminder of the consequences for any forensic scientist who fails to carry out his or her professional responsibilities.

Palestinian Arafat's Body Exhumed for Testing — *England*

The body of Palestinian leader Yasser Arafat, who died eight years ago in France, was exhumed by investigators seeking to determine whether he was poisoned. The exhumation was prompted by the discovery of high levels of Polonium 210, a deadly radioactive substance, on Arafat's clothing by a Swiss laboratory. According to CBS News, experts from Switzerland, France, and Russia will test the samples. Results are expected in several months.

Polonium 210 has some, although limited, industrial use. The isotope is used to control static charge. According to *Time* magazine, "A tiny amount of the radioactive compound is seated in a device attached to steel machinery spinning exceedingly fast. The potent isotope keeps a dangerous charge from accumulating and erupting."

Canadian Medical Examiner's Qualifications Are Questioned — *Canada*

An Alberta justice official is defending Calgary's Chief Medical Examiner, Dr. Anny Sauvageau, who critics argue lacks essential training in forensic pathology. Although the medical examiner system in Calgary has come under fire for several years, recent attention to Sauvageau's credentials comes following a \$2 million (USD) lawsuit in March 2012 by the family of a toddler whose death was determined to be a homicide by a discredited pathologist who later resigned.

Among Sauvageau's reported critics was Andrew Baker, president of the National Association of Medical Examiners (NAME).

Mexico Modernizes Its Criminal Justice System — *Mexico*

US Attorney General Eric Holder has announced the completion of Phase I training of Project Diamante in Mexico City. Project Diamante is a comprehensive, capacity-building effort developed by professionals of the Department of Justice to reform and modernize Mexico's criminal justice system.

As part of the project, hundreds of Mexican prosecutors, investigators, and forensic experts have been trained through a curriculum designed to stabilize and expand Mexican legal and law enforcement practices.

Holder shared his thoughts on the completion of Phase I: "I believe that we can all be encouraged by today's celebration and the broad-based engagement between our countries. With the personal commitment from the highest levels of my government, we can both confront increasingly complex and cross-border issues head on with a renewed sense of cooperation, solidarity, and partnership."

BEST PRACTICES

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Unprecedented Support Drives Progress in Wisconsin Crime Labs

With three laboratories employing approximately 160 people, Kevin Jones has his work cut out for him.

Since taking command of the Wisconsin crime laboratory system two years ago, Jones has pursued a strategy of bringing stability and efficiency to his system, once plagued with backlogs and a lack of consistency in how the laboratories conducted business.

In fact, a 2007 report by the *Milwaukee Journal Sentinel* described Wisconsin's forensic backlog as "monstrous". So serious was the issue that it may have affected the outcome of the 2006 fall elections.

In that year, the Republican candidate for attorney general, J. B. Van Hollen, defeated Democrat Kathleen Falk while promising to eliminate backlogs by hiring more forensic scientists and improving efficiency. Van Hollen set a target for the completion of DNA cases, which he projected could be reduced to three weeks following submission of the evidence to the laboratories.

Kevin Jones would eventually be tasked with leading Wisconsin's three laboratories, located in Madison, Milwaukee, and Wausau. His appointment came on the same day that Governor Scott Walker swept into office with an agenda of improving the function of state government. Walker's administration, combined with Attorney General Van Hollen's focus on forensic science improvements, established a foundation of support that "I have not experienced in my 30 years in forensic science," said Jones.

As a result, the DNA cases are being completed and reported in 35 days at the Milwaukee laboratory.

Jones added a major change in state government benefiting the laboratories was also Governor Walker's most controversial policy initiative. With the approval of the state legislature, Walker significantly restricted the collective bargaining rights of state employees, giving management the ability to respond more swiftly to sub-standard performance.

"Without those changes," Jones explained, "I doubt we would've had the same success. It would be very frustrating."

To the dismay of some union supporters within the laboratories, Jones initiated a small change to forensic science position descriptions that made ethical behavior a prerequisite of employment. Citing the U.S. federal *Brady* and *Giglio* rulings, which required evidence of an expert's dishonesty to be disclosed to the defense, Jones placed language in the position descriptions requiring forensic science experts to specifically remain free of the *Brady* and *Giglio* obligations in order to remain employed as a testifying forensic scientist.

When asked if the change was still being met with resistance, Director Jones said no. Instead, his most pressing concern was to have his staff understand how the changes protected *them*. "My intent is not to come across as insensitive or harsh," Jones explained. "I care about each employee and I think these changes are in their best interest. This is really common-sense stuff and I think the employees understand that."

Perhaps the biggest compliment to be paid to Wisconsin's leadership is the lack of employee interest in reorganizing their collective bargaining unit following the law passed by Governor Walker. "Our people realized they weren't getting much for the money they were spending on dues," Jones said.

Jones credits Wisconsin's progress to strong leadership and support within the entire chain of command. "Even the human resource management support has been unbelievable. They know what we need and help us get it quickly." For example, although Wisconsin operated for years with only a part-time quality assurance manager, Jones' effort to make the position full-time was embraced by HR and his command structure. Similarly, the attorney general approved the hiring of 31 new DNA scientists to add to the 20 who were holding the line on backlogs as best they could. Now, of the approximate 130 forensic scientists testifying in criminal trials, over 50 are conducting DNA analysis.

Perhaps what we are witnessing in Wisconsin is a model of strong leadership and support where the entire chain of command is committed to supporting and advancing forensic science in their state.

"What I have now is very special," says Jones. "I am going to enjoy it while I have it because I know that it probably won't last forever."

Until something changes, Wisconsin's laboratory system will be one to watch.

COMMENTARY

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A Forensic Scandal of a Different Sort

The word *forensic* has little meaning anymore. Perhaps, then, should we stop using it?

In April 2009, *Smithsonian* magazine reported^a about the work of astrophysicist Don Olsen, who uses cosmic science to study art, literature, and history. According to *Smithsonian*, Olsen got his start in forensic astronomy, as he calls it, when a colleague complained about trouble she was having in deciphering passages in Chaucer's *Canterbury Tales*, which were "loaded with astronomical references".

^a To access the *Smithsonian* article referenced in this commentary, please visit: <http://www.smithsonianmag.com/arts-culture/Celestial-Sleuth.html>.

In *Canterbury Tales*, Chaucer seems to remark about a strange event using rather ambiguous language:

“And by his magic for a week or more / It seemed the rocks were gone; he cleared the shore ...”

Don Olsen theorized that Chaucer was likely describing a celestial event that occurred in 1340. In that year, the sun and moon aligned while at their closest points to Earth to form a solar eclipse; “their combined gravity caused extremely high tides off the coast of Brittany”.

Years later, Olsen would conduct an investigation into the 1945 sinking of the *USS Indianapolis* toward the end of World War II. In the annals of Navy history, the Japanese torpedo attack on the *Indianapolis* is most remembered for the 900 sailors who were thrown into shark-infested waters by the intense explosion. “Only 317 survived to be rescued four days later.” The ship’s captain was charged with negligence for his failure to avoid enemy fire.

Smithsonian described what happened to Captain Charles B. McVay:

“He was court-martialed and demoted, despite protests from men under his command that he was following standard procedures and testimony from the Japanese sub commander that McVay could not have escaped the attack. McVay committed suicide in 1968. He was exonerated in 2000 by a Congressional resolution that declared ‘the American people should now recognize Captain McVay’s lack of culpability for the tragic loss of the USS Indianapolis and the lives of the men who died.’”

As a self-described forensic astronomer, Olsen took an interest in the story of Captain McVay:

“After reading survivors’ accounts, researching weather conditions and analyzing astronomical data at the time of the attack, Olson concluded that the submarine had surfaced just when the Indianapolis was in the glittering path of the moon’s reflection, allowing the Japanese to see it silhouetted from ten miles away but obscuring the submarine from the Americans’ view.”

Once the *Indianapolis* was spotted by Japanese forces, “the ship was doomed,” Olsen explained.

It is not entirely unreasonable for *Smithsonian* magazine to describe Don Olsen as a *forensic* astronomer. Moreover, those familiar with forensic science will certainly recognize the potential for Olsen’s expertise to be applied legitimately to a legal question, thus justifying the *forensic* label.

But there is a problem. The *forensic* label is held sacred and inviolable by legal and science professionals who are burdened with the task of solving momentous

legal and judicial problems. Typically, this would include violent crimes against persons and civil actions related to significant losses or damage to property. In other words, forensic science is and should be a very serious business.

Recently, a *forensic* artist made news when he applied his expertise to create images of what he believes Prince William and Princess Kate’s coming baby might look like. No doubt, the press coverage will likely afford him a degree of name recognition that he might not have otherwise enjoyed. But the comingling of the forensic name with such a trivial pop-culture spectacle might be considered offensive to those who believe forensic science transcends things of such little consequence, relatively speaking.

Language exists to communicate ideas and concepts, and is subject to change as dictated by social and professional norms. If *forensic* fails to serve as a useful term for communication, then it may suffer a slow and painful death.

EMERGING METHODS AND TECHNOLOGIES

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Rapid DNA

It is perhaps the most anticipated technological advancement in forensic science since the development of the IBIS system allowed for the databasing and searching of fired bullets and cartridge cases in the mid-1990s.

As two companies, IntegenX and NetBio, lead the marketplace on the development of this field-based DNA testing, which promises to generate DNA profiles in less than two hours, the law enforcement community is faced with the prospect of having to incorporate the technology into their booking and investigative environments. For this reason, Rapid DNA stands to emerge as a policy and administrative innovation as much as it is a technological one.

NIST Firearm Research — On the Cutting Edge

The National Institute of Standards and Technology in Gaithersburg, MD, recently showcased work being conducted by researchers and scientists at its 578-acre campus near Washington, DC. The three-day conference was held November 28–30, 2012, and consisted of over 45 live-webcasted scientific lectures and 50 poster presentations. The presentations are available online at: <http://www.nist.gov/oles/forensics-2012.cfm>.

Among the work being conducted at NIST to further the advancement of forensic science is the use of 3D surface topography measurement instrumentation to measure both striations on the surface of fired bullets and marks left on shell casings. Using confocal microscopy combined with software that reads and maps the contours of the striations, researchers at NIST are able to produce objective three-dimensional images of bullet surfaces that can later be used to establish match probabilities, thus allowing firearms examiners to quantitatively describe their conclusions.

Among the concerns with this technology is the belief that it will put firearms examiners out of work. Attendees at the NIST conference heard a different message, which emphasized the technology as a tool to support the work of firearms experts, not replace them.

Similar work being conducted with confocal microscopy at the Alabama Department of Forensic Sciences was presented at the 2012 AFTE meeting and has also produced promising results.

For more information about confocal microscopy, please visit the Technology Transfer section of the FTCoe website at www.forensiccoe.org.

Next-Generation DNA Sequencing (NGS)

Over the past 25 years, forensic science has developed and implemented various robust and reliable DNA typing technologies for human identity testing. The technologies enable analyses of extremely minute quantities of DNA that can be reliably typed with a resolving power such that in many cases the number of potential contributors of an evidence sample can be reduced to only a few individuals, if not only one source.

NGS technology offers massively parallel sequencing with low cost, high coverage, low error, and high throughput of specified targets or feasibly whole genomes. Because of the high throughput, a large battery of genetic markers can be analyzed simultaneously, far exceeding the current capacity of 15–21 STRs of a fluorescent multiplex/capillary electrophoresis system. In theory all forensically relevant identified autosomal STRs, Y STRs, X STRs, human-identity SNPs (more than 300 markers), and mitochondrial DNA can be analyzed in one run. Moreover, with the high throughput afforded by NGS and barcoding, 96 to 384 individuals could be profiled simultaneously. Thus, with economies of scale it is possible that reference samples can be run economically and eventually rival current costs for typing a modicum of autosomal STRs.

Art Eisenberg and Bruce Budowle currently lead the development of this technology at the University of North Texas Health Science Center.

UPCOMING EVENTS

American Society of Crime Laboratory Directors — Annual Symposium

May 6–9, 2013
Sheraton Imperial Hotel and Convention Center
Durham, NC, US

Association of Firearm & Toolmark Examiners — Conference

June 23–28, 2013
Hyatt Regency Albuquerque
Albuquerque, NM, US

International Association for Identification — International Educational Conference

August 4–10, 2013
Rhode Island Convention Center
Providence, RI, US

American Society of Questioned Document Examiners — Annual General Meeting

August 24–29, 2013
Embassy Suites Indianapolis
Indianapolis, IN, US

International Council on Alcohol, Drugs and Traffic Safety — T2013 International Conference

August 25–28, 2013
Brisbane Convention & Exhibition Center
Brisbane, Queensland, Australia

The International Association of Forensic Toxicologists — Annual Meeting

September 2–6, 2013
Pestana Casino Park Hotel
Funchal, Madeira, Portugal

Clandestine Laboratory Investigation Association — Training Conference

September 9–13, 2013
Tulsa, OK, US

International Symposium on Human Identification — ISHI 24

October 7–10, 2013
Hyatt Regency
Atlanta, GA, US

International Association of Forensic Nurses — International Conference on Forensic Nursing Science and Practice

October 21–24, 2013
Disneyland Hotel
Anaheim, CA, US

Society of Forensic Toxicologists — Annual Meeting

October 28–November 1, 2013
Buena Vista Palace Hotel
Orlando, FL, US

BOOK REVIEW^a

An Introduction to Forensic Geoscience (2012)

Elisa Bergslien, PhD

Wiley-Blackwell: Hoboken, NJ, US

Reviewed by: *Michael R. Baylor and John M. Collins, RTI International, Research Triangle Park, NC, US*

Dr. Elisa Bergslien founded the forensic chemistry program at Buffalo State College in the 1970s. The program eventually included a course on forensic geoscience, created in 2005, which the author explains led tangentially to the publication of the present book.

Published in April 2012 by Wiley-Blackwell, this comprehensive introduction to what could very well emerge as a newer and more often utilized forensic laboratory discipline is 498 pages divided into eleven chapters. A companion website is available to supplement the material presented in the book, which can be accessed at: www.wiley.com/go/forensicgeoscience.

A Kindle version is available for download and reading on personal tablets and readers, and can be accessed through Amazon.com.

Bergslien opens her text with a preface that captures its overall purpose and potential. In it, she explains how the topic came of interest, which eventually led to the creation of a forensic geoscience course at Buffalo State College in 2005. Among her most significant challenges in creating this new course was the scarcity of introductory level literature that didn't depend on readers having previous knowledge about earth sciences and their potential application to criminal cases. Bergslien admits that literature contributing significantly to the scientific record was available. There was, however, a remarkable absence of material that could successfully introduce the forensic geosciences to readers whose scientific background may be limited to the basic natural sciences.

An Introduction to Forensic Geoscience clearly seeks to fill this void by defining forensic geoscience and its underlying foundations while retrospectively exploring how it has already helped to solve a variety of criminal cases. What's more, Bergslien seems to succeed in her effort to carefully situate forensic geoscience within the broader historical and contemporary contexts that have shaped forensic science as we know it today. In doing so, readers will be able to see forensic geoscience as an emerging discipline without losing appreciation for how it has already contributed to the resolution of real cases.

In addition to the preface, case summaries, and introductory materials that lead readers into a general understanding of the subject matter, the book's chapters are segregated along technical lines. Minerals, rocks, sand, gems and gemstones, soil, and fossils, for example, are some of the subjects for which individual chapters have been created. Bergslien also dedicates chapters to environmental forensics (pollution) and forensic anthropology, the latter being an exploration of people's effects on the land.

Finally, readers with a background in crime scene processing will likely derive specific benefits from the materials presented in this book. Bergslien takes time to outline the general aspects of crime scene processing with the likely expectation that readers will be able to see for themselves where geological materials are most likely to be encountered and collected for use in an investigation. For crime scene responders, an increased understanding and awareness of geological evidence could potentially pay great dividends in the most serious of criminal cases, especially in those instances where more common forms of evidence may not be available.

Hardcover copies of this book retail at approximately \$150 USD, with the paperback editions retailing at approximately \$60 USD. The Kindle version can be conveniently downloaded from Amazon.com for approximately \$35 USD.

^a To recommend a book for review, please e-mail John Collins at RTI International at collins@rti.org.