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ISHI INTERNATIONAL SYMPOSIUM ON HUMAN IDENTIFICATION

PALM SPRINGS, CA | SEPT. 23–26, 2019

JULY 2019

The ISHI Report

News from the World of DNA Forensics

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The ISHI Report

Letter from the Editor

Welcome to the summer issue of the ISHI Report! As the July issue heads to press, the team behind the International Symposium on Human Identification is busy finalizing details for the 30th symposium in Palm Springs, California. The general session program is now available on the conference website. This year's keynote presenation will be delivered by Paul Holes on how the Golden State Killer was identified and brought to justice.

Other presentations include updates on CODIS, NDIS, and the ICMP. We'll also learn more about using forensics to stop human trafficking, integrating Rapid DNA into your laboratory and how to utilize it during a disaster scenario, deconvoluting mixture profiles, and incorporating massively parallel sequencing (MPS) into your workflow. The agenda also features numerous interesting case presentations featuring the DNA Doe Project's successes, cold cases, the case of Angie Dodge, and more.

The July ISHI Report features articles contributed by several of the workshop and general session speakers. Charlotte Word addresses a topic that strikes dread in the heart of many a DNA analyst: identifying DNA contamination events and how to manage them. Sacramento Coroner Kimberly Gin and Richard Selden, Chief Science Officer of ANDE, explain how Rapid DNA was used to speed the identification of remains recovered from the devasting Paradise Camp Fire in California last year.

Investigative genealogy has closed numerous cold cases in the past year and a half, and continues to prove invaulable to law enforcement. Yet, the recent change in the GEDmatch database limits the number of profiles accessible for future searches. What does the future of investigative genealogy look like? We asked experts in the field to help clarify.

Amanda (Mandy) Sozer gives her perspective as a business owner on the intersection between DNA forensics and government including use of Rapid DNA at the border, as well as her company's contributions during mass disasters such as the World Trade Center 9/11 disaster and the aftermath of Hurricane Katrina. Mandy and other HITA affiliates will be offering a free workshop at ISHI on Sunday, September 22 providing guidance on best practices for dealing with mass disaster events using ASCLD response tools.

Also, in this issue, Ken Doyle from Promega will give an overview on the history of Innocence Projects in the United States and Karen Ehlers from University of Free State in South Africa contributes a case study where touch DNA was identified from the carcass of a poached rhinoceros.

As we celebrate the 30th anniversary of the International Symposium on Human Identification, this year's panel explores new methods and technologies that will soon be available to forensic scientists. Athina Vidaki of Erasmus University Medical Center leads the panel and provides a glimpse into what will be discussed.

Finally, we introduce you to the team who organizes the International Symposium on Human Identification. If you've ever wondered what our staff does for fun outside of work, these interviews will prove revealing.

We hope to see you at the upcoming symposium this September. We have a number of special activities planned to commemorate the thirtieth anniversary of ISHI!

Warm Wishes,

The Editorial Board

Contact ISHI

Have you ever wondered how abstracts are chosen for presentation at ISHI?

All abstracts received are collated by the ISHI staff in the order that they were submitted.

They are then made anonymous (to minimize bias and ensure talks are selected based on merit) before being sent to an outside panel of international experts.

The panel then selects presentations based on timeliness and interest to the forensic community.

The committee thanks all those who contributed an abstract for consideration. As always, more abstracts were submitted than can be presented during the conference.

Enthusiastic community involvement in ISHI helps to keep the topics addressed during the meeting current and valuable for the forensic community.

A Guide to Interpreting and Reporting

Contaminated Profiles

Interview written and condensed by
Carol Bingham, Tara Luther, Promega



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In the early days of DNA profiling, Restriction Fragment Length Polymorphism (RFLP) testing required a relatively large amount of DNA for the development of a DNA profile, and the bloodstain left behind was still visible or detectable using presumptive testing. By the late 1990s, Polymerase Chain Reaction (PCR) testing had replaced RFLP, and the amount of DNA required to develop a profile was greatly reduced. As the years have progressed and sensitivity has increased, the amount of DNA required to develop a profile has been reduced even further to just a few skin cells.

While these advances have helped to solve numerous cases, it has also introduced the issue of contamination to forensic laboratories. The Quality Assurance Standards for Forensic DNA Testing Laboratories states that, "A laboratory shall have and follow a documented policy for detecting and controlling contamination," but sometimes it's not possible to identify the source of the contamination, and DNA profiles affected by the presence of contaminating DNA may be interpreted.

Charlotte Word will be leading a workshop entitled *Interpreting and Reporting Contaminated DNA Profiles* on Monday, September 23rd at ISHI 30. In this workshop, attendees will:

- Learn more about the sources of and steps to mitigate contamination
- Work through a root cause analysis and corrective action plans for a contamination event
- Get hands on experience interpreting and reporting profiles affected by contamination events
- Gain a better understanding of legal issues resulting from contamination

In order to learn more about the prevalence of contamination in DNA laboratories, we interviewed Charlotte to discuss common sources of contamination, steps to take to minimize contamination, and what she recommends labs do if they find a contaminated profile.

Charlotte, thank you for sitting down with us today!

How common is the problem of contamination in DNA testing laboratories? Does virtually every lab experience contamination?

It would be rare for a laboratory to not experience some level of contamination at some point. It is impossible to eliminate all contamination; however, having knowledge of potential problem areas and use of appropriate safeguards and good evidence handling procedures can help decrease the risk.

What are the most common sources of contamination?

- From individuals handling the evidence at any stage of collection through testing
- Transfer from one sample to another during evidence handling or sample testing
- Using consumables that are not free of DNA

What are steps that every lab should take to minimize the chances of contamination?

These are too numerous to list here but include ALL procedures for proper evidence handling by ALL individuals during ALL stages of the collection, packaging, screening and testing of the evidence, and using all safeguards in the laboratory during testing. Extreme care is critical regarding the use of gloves and frequent changing of gloves when handling evidence as well as being sure not to talk over the evidence at any time.

Do you recommend that laboratories establish a database of all employee's DNA profiles to be used in the case of contamination?

Yes. This has been very helpful in many cases sorting out that the "unknown" DNA contributor was actually someone in the chain of custody of the evidence, an individual who was present at the crime scene or someone who worked in the same area where the evidence was being tested. Detecting contamination from a known individual can eliminate that DNA profile from being entered into CODIS.



Are there legal or ethical issues to be considered when establishing an employee database? How can these issues be addressed?

Not detecting a contaminating profile may lead to the profile of an employee being inappropriately entered into CODIS. This may result in law enforcement waiting for a hit to the perpetrator that will never come and/or not following up on a suspect who may be involved in the crime due to an "exclusion" of the individual from the contaminant profile. If the contamination is detected, the appropriate profile from the perpetrator of the crime may be entered into CODIS and be available for comparison.

If a DNA profile is affected by contamination, can it still be interpreted? Or should it be discarded?

The profile can be interpreted using the same interpretation methods used for single source and mixed DNA samples in the laboratory and compared to the profiles of known individuals as is routinely done in the laboratory. Mixed DNA profiles may be resolved using standard practices and assumptions of contributors in many cases.

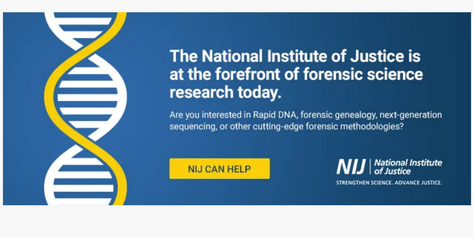
Who will benefit from attending?

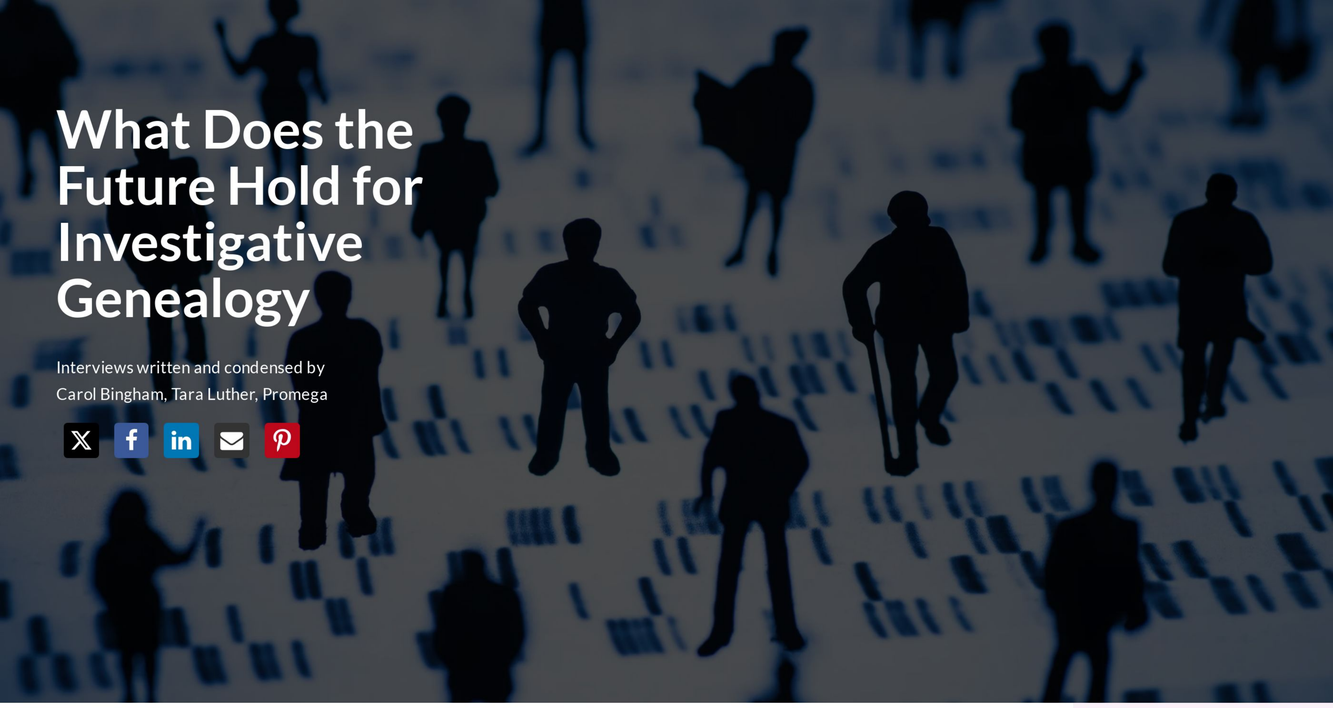
- Anyone interested in knowing more about contamination and the interpretation of contaminated evidence and its impact on the criminal justice system.
- Essentially anyone who handles or works around evidence or is involved in the use of the DNA results and conclusions derived from evidence would likely benefit.
- This would include analysts (DNA and anyone who handles evidence), QA/QC managers and personnel, auditors/inspectors, crime laboratory directors and section managers, attorneys, judges, consultants, academics.

Charlotte, thank you again for taking the time to talk with us. As contamination impacts all forensic laboratories, it's important for attendees to have an opportunity to learn more about reducing contamination and interpreting contaminated profiles.

If you would like to learn more about and register for the workshop at ISHI, visit our website.

Learn More





What Does the Future Hold for Investigative Genealogy

Interviews written and condensed by
Carol Bingham, Tara Luther, Promega

Across the United States, and increasingly internationally, detectives are closing cases that have long since grown cold using investigative genealogy. Killers and other predators who have managed to escape justice due to a lack of leads are now finding themselves behind bars.

Investigative genealogy relies heavily on open-source DNA databases, such as GEDMatch, where users upload their DNA raw data files. Originally intended for use by genealogy hobbyists, the site has been a gold mine for investigators. Once they upload DNA profiles of suspects taken from crime scenes, they are then able to search for close familial matches and try to build the suspect's family tree. Once the tree has been built, investigators are able to uncover the identity of the suspect, giving them a lead in the case.

Since 2018, over 55 cases have been closed, and several John and Jane Does have been identified using investigative genealogy techniques, but the future of the technique is unclear.

On November 17, 2018, a 71 year-old woman was attacked while she was practicing the organ in a church meetinghouse. CeCe Moore, an investigative genealogist, was asked to assist with the case. Knowing that using the GEDMatch database to solve an assault case would violate their terms of service, she initially declined. With express permission from Curtis Rogers, founder of GEDMatch, investigators were allowed to use the database to identify the attacker.

Facing public backlash for violating his website's terms of service, Rogers quickly updated GEDMatch policy to require users to opt-in to allowing their profiles to be used for investigative purposes. Where there were once almost 2 million searchable profiles, 20,000 remained as of June 9, 2019.

Though users continue to opt-in, where does this leave the future of investigative genealogy? CeCe Moore told CNN, "We can be sure there are hundreds of cases that would have been solved in the coming months or year that very well won't be now. People will die. It sounds dramatic, but it's actually true."

What does the future hold for forensic labs interested in investigative genealogy? No one knows for sure, but we interviewed a panel of experts to get their opinion.

Interested in learning more about investigative genealogy?

Jody Hynds will chair a workshop entitled *Family Ties: Using Genetic Genealogy to Solve Violent Crime.* Attendees will develop a holistic understanding of investigative genetic genealogy and receive material that enables them to educate their respective communities on this revolutionary tool. The workshop will also enable attendees to develop a more comprehensive understanding of legal issues surrounding genetic genealogy and best practices to balance public safety with privacy concerns.

Workshop Schedule:
Monday September 23, 2019
8:30 am—5:00 pm

Learn More

Diahan Southard will chair a workshop entitled *Can You Solve Your Case Using Genetic Genealogy?* "The workshop will be a hands-on case study from start to finish," says Southard, "so attendees will learn about what kinds of cases qualify for the use of genetic genealogy, as well as the step-by-step process involved."

Workshop Schedule:
Thursday September 26, 2019
1:00—4:00 pm

Learn More

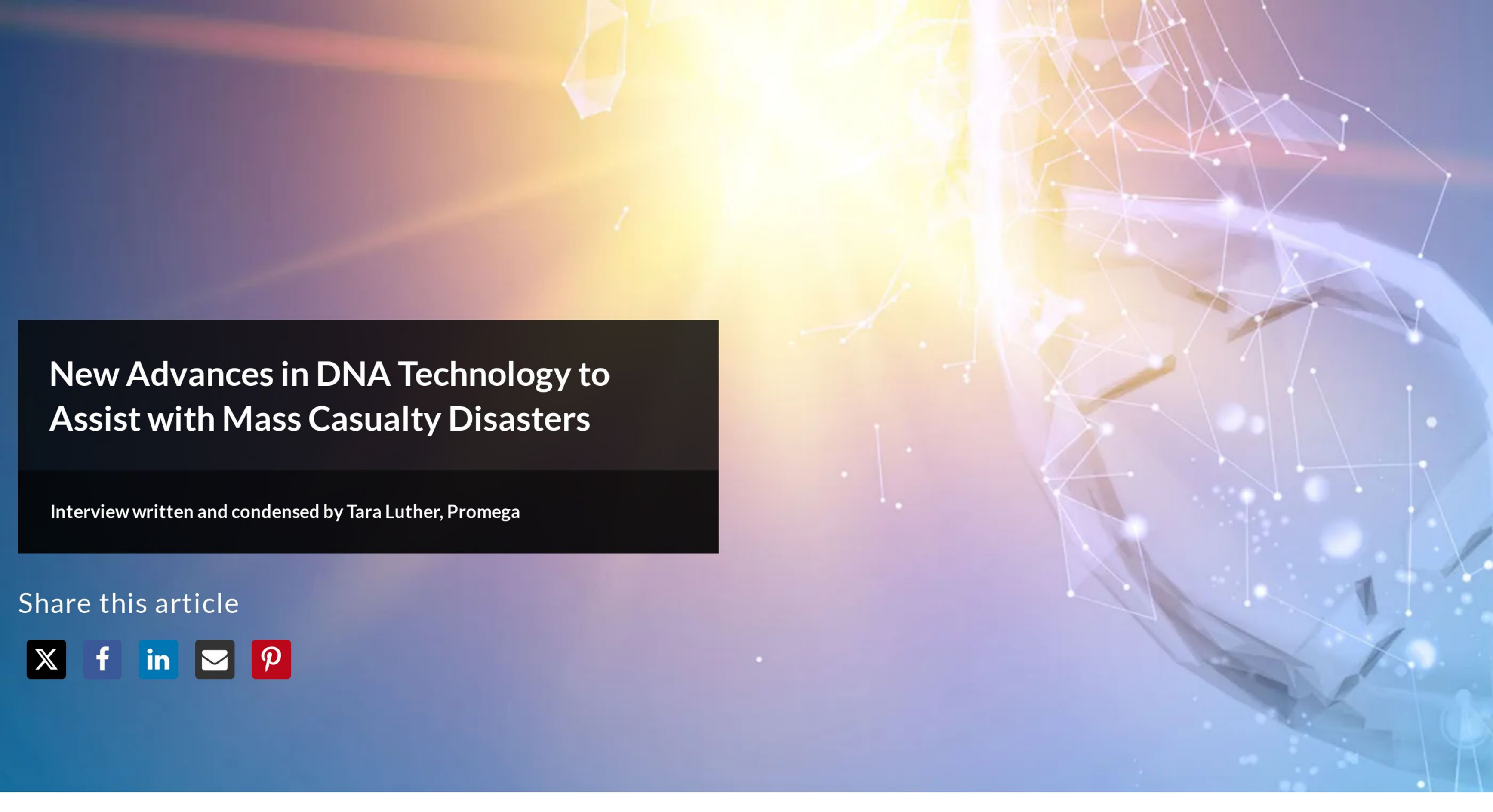
Click the images below to read the interviews











New Advances in DNA Technology to Assist with Mass Casualty Disasters

Interview written and condensed by Tara Luther, Promega

Share this article

In 2015, then-FBI Director, James Comey, said Rapid DNA would "help us change the world in a very, very exciting way."

Allowing for DNA profiles to be obtained from buccal swabs in a hands-free manner from a reference swab in under two hours, the technology has many applications.

Since the passing of the Rapid DNA Act in 2017, Rapid DNA platforms are being used in several different laboratories as a means to compare an arrestee sample to the CODIS database, or as a way to separate co-mingled remains. Rapid DNA is a powerful tool in mass fatality situations, such as the California Wildfires of 2018, where time is of the essence.

At ISHI 30 this year, Mandy Sozer of SNA International will be co-chairing a workshop entitled *Are You Prepared for a Mass Fatality Incident Response?* In this workshop, attendees will work collaboratively in small groups to evaluate a mass fatality accident and organize an appropriate Rapid DNA response for victim identification using The American Society of Crime Lab Directors (ASCLD) response tools and best practices.

We caught up with Mandy to discuss how ASCLD is mobilizing Rapid DNA units to mass fatality sites and what the public response has been so far.

Mandy, thank you for joining us today. Can you please tell us a little bit about your background and about SNA International?



I got my start in using DNA for human identification right out of graduate school, when DNA fingerprinting was just starting in the US. For my dissertation, I mapped mouse retroviruses using restriction enzymes combined with radioactive probes and Southern blotting. After graduate school, I applied to an opening at Cellmark Diagnostics where I could use these same techniques to identify criminals and answer questions on how people were related. This was well before CSI was on TV. Nonetheless, it was a very exciting time to be at the forefront of using DNA for forensics and having those results used in courts of law. While I was involved in some criminal work at Cellmark my main focus was on relationship testing, which I found most interesting.

After several years with Cellmark I took a position at Fairfax Identity Laboratories, where I managed paternity operations and developed convicted offender DNA profiling services and forensic testing services. I stayed at Fairfax for a number of years, where the business grew to the point where we were testing approximately 100,000 samples a year.

While I enjoyed the challenge of running labs, I found myself intrigued by the consulting world. In 2001, I left Fairfax and started my own consulting business.Shortly thereafter, I was asked by the National Institute of Justice (NIJ) to respond to the World Trade Center 9/11 disaster, the largest human DNA identification effort ever undertaken. It was complex and fast-paced. Fortunately, I was able to use what I had learned from large-scale DNA relationship and forensic testing to facilitate the World Trade Center DNA Kinship and Data Analysis Panel (KADAP) for NIJ.

Most importantly for me both personally and professionally, in 2002, while riding on a train back and forth from DC to NYC, Steve Niezgoda and I started Sozer, Niezgoda and Associates, LLC, now known as SNA International. Our mission is to help build a safe and just world by empowering organizations in the use of human identification and forensic science. We have expanded from mass fatality response and planning to include pharmacogenetics, laboratory operations and accreditation consulting, genealogy research, information technology identity intelligence, and Rapid DNA technology implementation.

In 2005, we were tasked with managing the identification efforts of victims post-Hurricane Katrina. Since then, SNA and our professionals have responded to more than 50 mass fatality incidents, and our forensic scientists have supported forensic operations at the local, state, and federal levels, as well as internationally. SNA also supports the Department of Homeland Security's efforts to commercialize Rapid DNA, a government-led innovation to get human DNA results in hours instead of weeks.

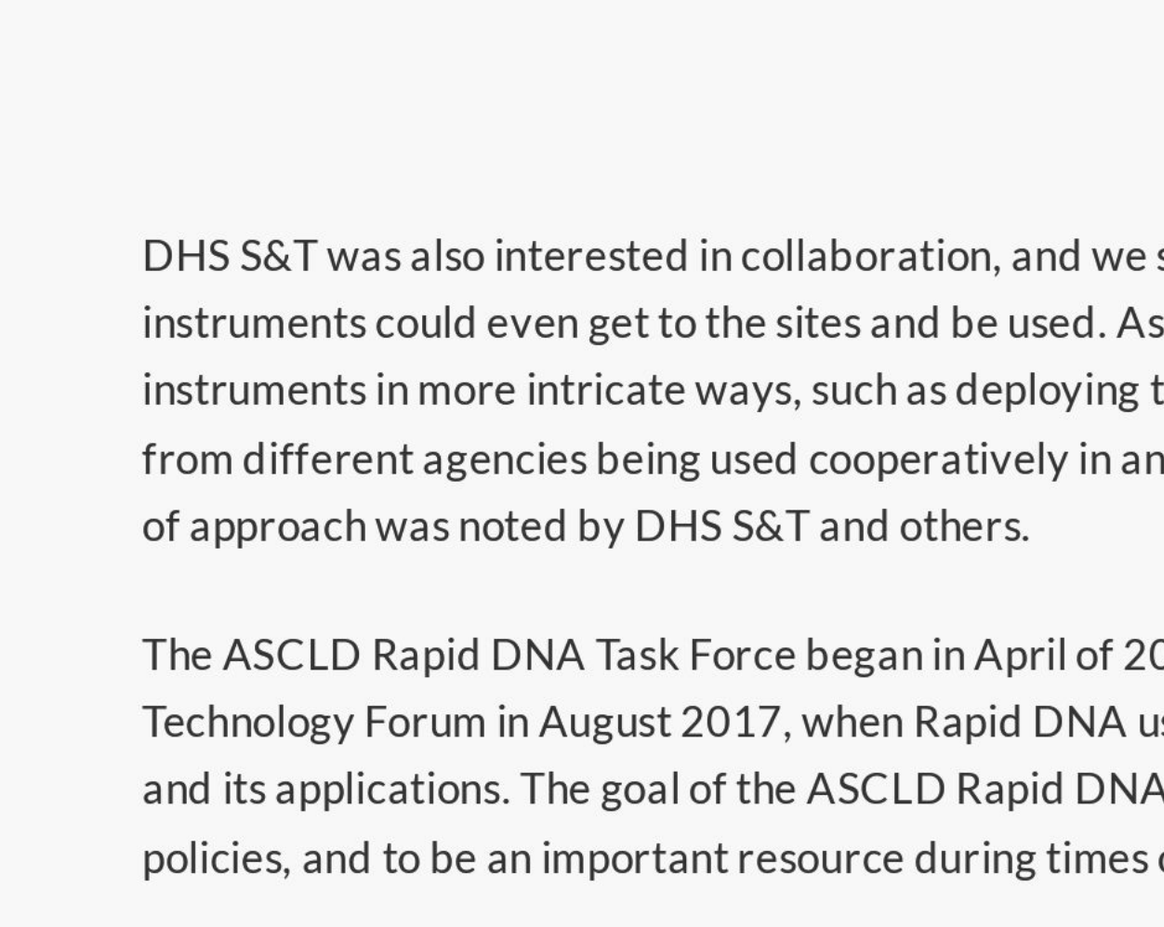
I'd love to learn more about your collaboration with ASCLD to mobilize Rapid DNA instruments! How did this project get started and what is the goal?

Following Hurricane Katrina, we recognized that there was no group response for DNA operations similar to the way the Disaster Mortuary Operations Response Team (DMORT) operates for morgue operations. This led to the National Institute of Justice (NIJ) providing support for a forensic DNA "Co-Op."

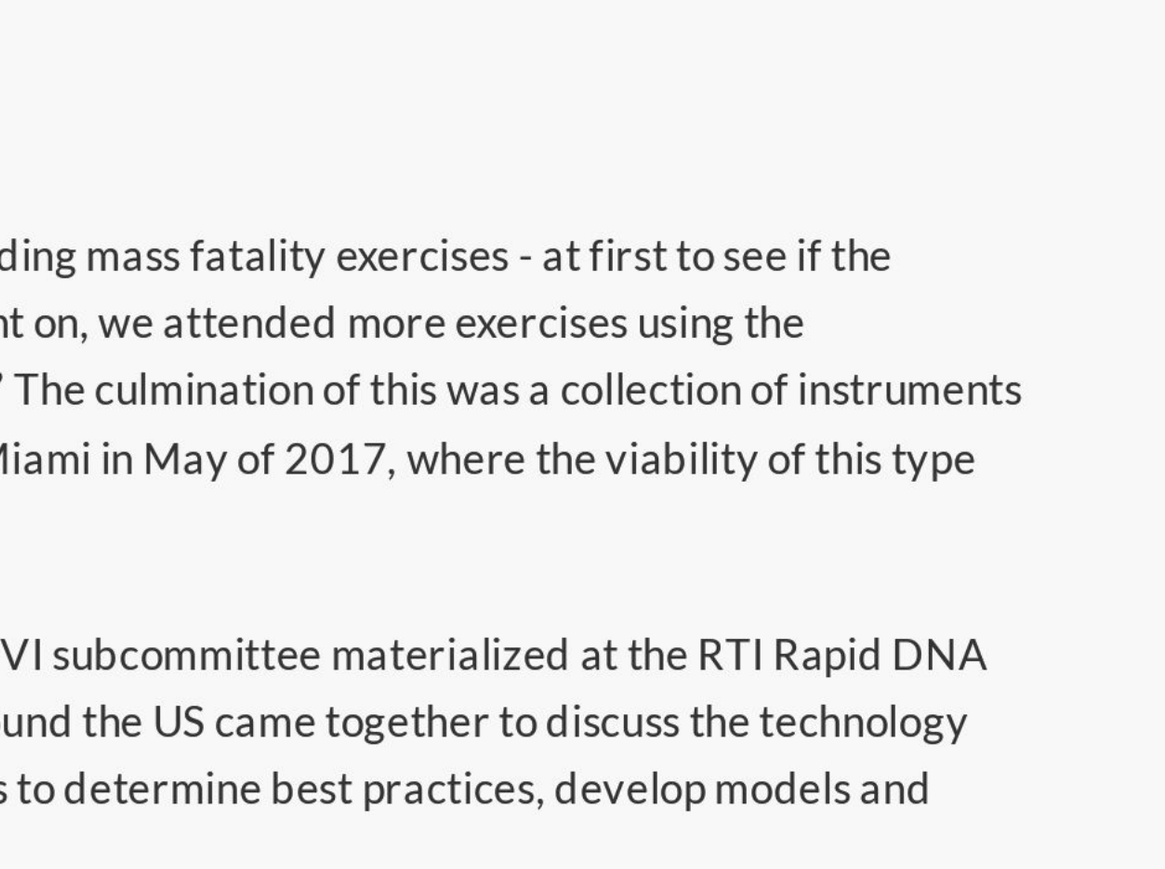
Following Katrina, NIJ funded forensic DNA analysts from around the US to support the DNA efforts in Louisiana.Analysts came for two-week periods and, after rigorous training and a competency test, they supported the data analysis section of the DNA identification operations.

The benefits of this Co-Op program were two-fold. First, the forensic DNA analysts provided much-needed staffing relief to the DNA identification effort and secondly, they learned about the intricacies of a complex DNA identification effort using kinship testing. NIJ's hope was that it would help better prepare them for future events. Unfortunately, following Katrina there was not much interest from the government in keeping the group going.

In 2015, SNA responded to a Broad Agency Announcement from the Department of Homeland Security (DHS) and has since supported DHS's Science and Technology (S&T) Directorate's strategic implementation of Rapid DNA. It was at this time, after we had hands-on time with DHS's Rapid DNA instruments, that we realized the tremendous value Rapid DNA can bring to a mass fatality response incident.



Attendees participate in a Mass Disaster Response Workshop at ASCLD



SNA hosts Mass Disaster Response Workshop at ASCLD

DHS S&T was also interested in collaboration, and we started attending mass fatality exercises - at first to see if the instruments could even get to the sites and be used. As the year went on, we attended more exercises using the instruments in more intricate ways, such as deploying to a 'hot zone.' The culmination of this was a collection of instruments from different agencies being used cooperatively in an exercise in Miami in May of 2017, where the viability of this type of approach was noted by DHS S&T and others.

The ASCLD Rapid DNA Task Force began in April of 2017 but the DVI subcommittee materialized at the RTI Rapid DNA Technology Forum in August 2017, when Rapid DNA users from around the US came together to discuss the technology and its applications. The goal of the ASCLD Rapid DNA Task Force is to determine best practices, develop models and policies, and to be an important resource during times of need.

Which labs are participating?

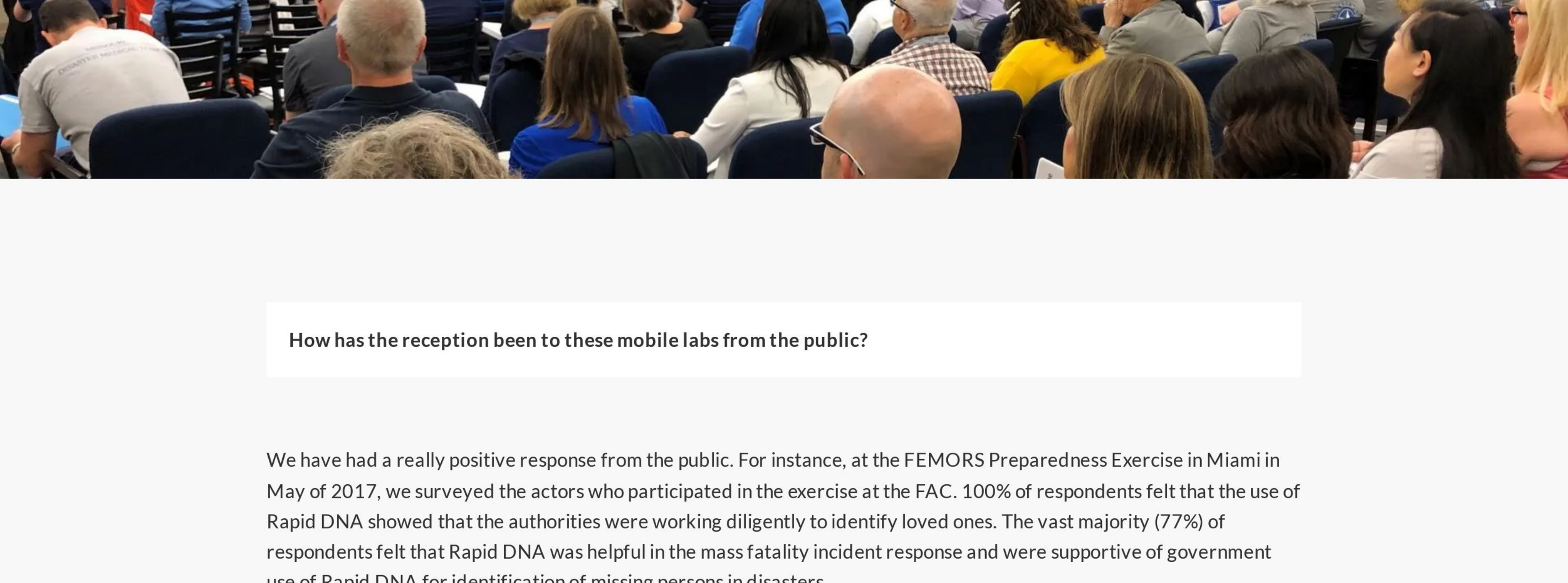
There are currently approximately 40 members, representing every level of government, from over 16 states.

When are mobile labs appropriate?

Mobile labs are appropriate where quick, accurate identifications are a key feature of an effort. Examples might include mass fatality incidents where the condition of the remains (e.g., decomposition or fragmentation) does not allow for other traditional methods of identification, or if there is a radiation or chemical element to the incident. The use of Rapid DNA instruments speeds the identification effort, bringing answers to families faster.

What are the benefits to these mobile labs versus a traditional lab?

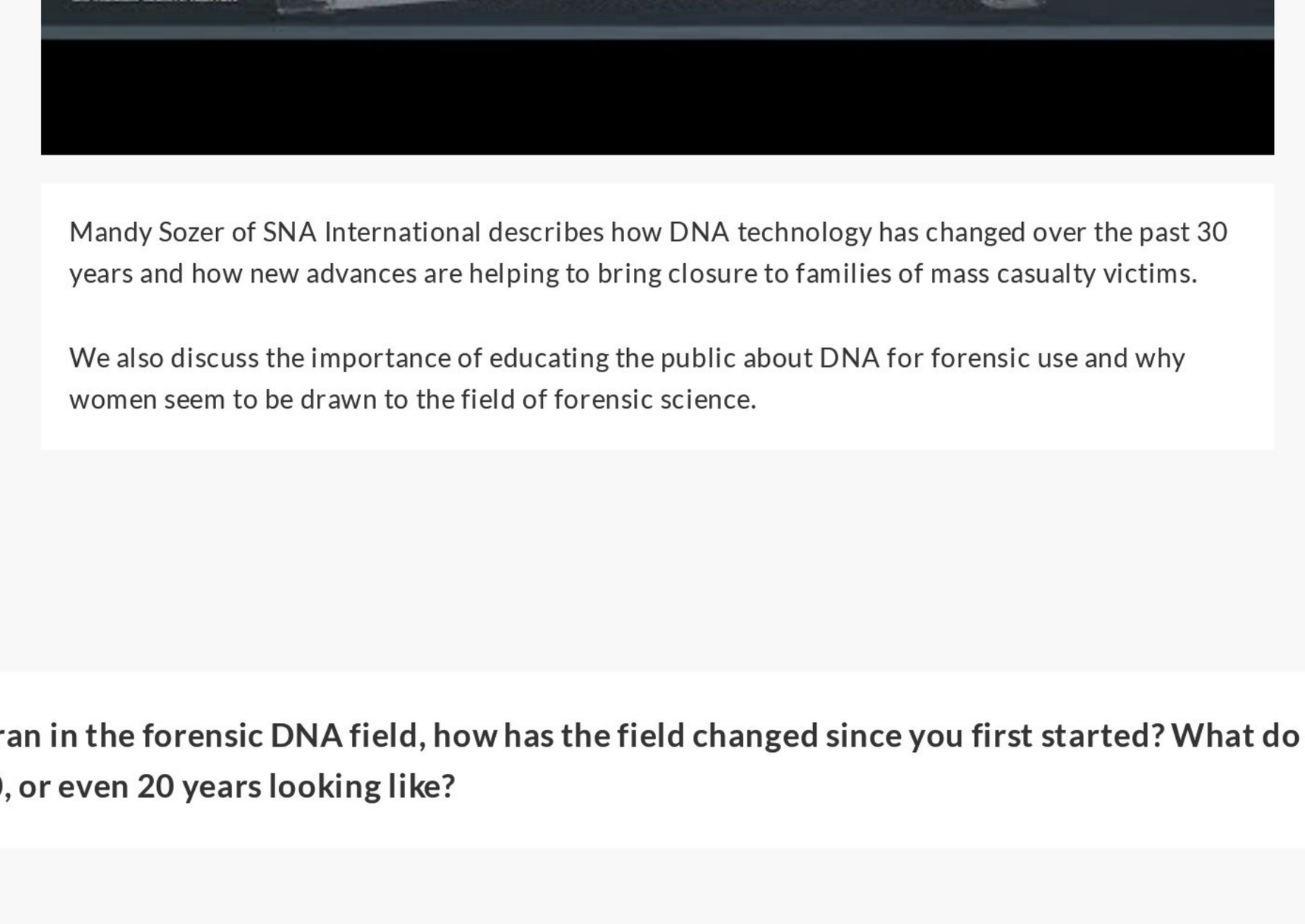
The benefit of a mobile lab is that it can be parked wherever the response operations are taking place, or the instruments themselves can be transported to the operations sites: we don't have to worry about the time it would take for samples to be transported to a traditional lab. Having the instruments on-site also simplifies the chain of custody and lessens the chance of mixing up samples. Additionally, this time saving translates to cost savings because the quicker identifications are made the less time the incident morgue and Family Assistance Center (FAC) have to operate.



How has the reception been to these mobile labs from the public?

We have had a really positive response from the public. For instance, at the FEMORS Preparedness Exercise in Miami in May of 2017, we surveyed the actors who participated in the exercise at the FAC. 100% of respondents felt that the use of Rapid DNA showed that the authorities were working diligently to identify loved ones. The vast majority (77%) of respondents felt that Rapid DNA was helpful in the mass fatality incident response and were supportive of government use of Rapid DNA for identification of missing persons in disasters.

I think that the public understands the potential for Rapid DNA to really make a difference. I was out in California during the Camp Fire mass fatality response last fall, part of a government-sponsored group observing and evaluating the Rapid DNA response. I was able to witness the tremendous power of Rapid DNA first-hand. In the majority of cases, more traditional methods of victim identification were virtually impossible because most remains were burned, leaving few physical characteristics intact. Rapid DNA was very helpful in identifying cases where samples were collected and run in the FAC: over 85% of remains were identified through Rapid DNA.



Mandy Sozer of SNA International describes how DNA technology has changed over the past 30 years and how new advances are helping to bring closure to families of mass casualty victims.

We also discuss the importance of educating the public about DNA for forensic use and why women seem to be drawn to the field of forensic science.

As a veteran in the forensic DNA field, how has the field changed since you first started? What do anticipate the next 5, 10, or even 20 years looking like?

Since I started, what has really changed has been the sample size and the sensitivity. I believe that DNA testing will continue to get smaller, faster and more automated, and this will allow us to do more with it!

What changes have you noticed throughout the years?

One thing I have noticed is that DNA is becoming faster, we're using it more, and for new applications. One new application SNA is involved in is using DNA as a biometric like fingerprints or facial/iris recognition.

SNA has been working with the Department of Homeland Security's Office of Biometric Identity Management (OBIM) to develop a Store-Match-Share (SMS) software prototype that will allow DNA to be a modality of biometric identification. This is a really exciting project as it uses information technology to streamline DNA data analysis and reporting. This was the idea that started SNA back in 2002!

The SMS program establishes a capability for DNA as the newest new biometric modality within DHS and has five core DNA-related use cases upon which all DHS mission scenarios are based. These five use cases are: kinship matching when all family members are in one location; kinship matches when family members are separated geographically; finding direct DNA identity verification matches; tracking sample collections and searching against DNA databases. All searches are real-time and nearly everything is automatic. The software is also smart as profiles do not need to be "perfect" -- the software can accept partial or less than perfect profiles.

In addition to the Federal Government, I think this new technology will be of great interest to the state and local Rapid DNA users to be faster and more efficient and effective in how we search and Report DNA profile matches.

How many ISHI meetings have you attended?

I know I didn't attend the first one, but I have tried to attend every meeting as long as I wasn't due in court. I think there are only a handful I have missed since its inception!

Do you have any favorite memories from past meetings?

ISHI puts on such great meetings and chooses such great resorts. I remember the early meetings at La Posada Resort and in the evenings, sitting around the gorgeous pool!

Mandy, thank you for joining us today. If you would like to learn how you and your lab can be better prepared for a mass fatality event, consider attending the HITA Workshop (Are You Prepared for a Mass Fatality Incident Response) on Sunday, September 22nd. Registration is free to those attending ISHI 30.

Learn More

Advertorial

Forensic DNA Processing Efficiencies using a Novel Consumable Device and Automated Workflow

Kevin Miller, Hamilton

Share this article

A significant contributing factor to forensic DNA sample backlogs is the manual nature of sample manipulation from sample collection through analysis. Each step introduces risks that may break a sample's chain-of-custody or require retesting of the sample, which may be limited. Risk-contributing human errors may include documentation and labeling errors, cross-contamination, and lost samples that completely eliminate a crucial testing opportunity. Likewise, analyst subjectivity and performance variability, including that over time and among different analysts within the same laboratory, may introduce uncertainty that could be challenged in court.

Manual DNA evidence sample handling is also time-consuming, especially once the samples arrive at the laboratory. Sample throughput via manual means is limited by the analyst, who spends considerable time on low-value activities such as liquid pipetting.

A Novel Approach to Alleviate Forensic DNA Sample Backlogs

An automated workflow, incorporating unique AutoLys tubes and the AutoLys STAR assay ready workstation, both from Hamilton Company (Reno, NV), provides a low-risk, time-saving solution to reduce forensic DNA sample backlogs.

Figure 1:

Consumable AutoLys-A tubes (**Figure 1**) have a unique tube-in-tube configuration to facilitate hands-free forensic DNA sample processing. An inner tube with screw cap serves as a nucleic acid extraction unit, and may be used as a lysate filtration (spin basket) device using a non-DNA binding membrane for conventional evidence processing, or without a membrane for differential extraction of sexual assault evidence using conventional procedures. The outer tube is 2D barcoded on its base for easy scanning from the bottom of an AutoLys tube rack. The barcode creates a chain-of-custody to automatically and independently verify each sample (and reagent blank) and correlate it with the item number, case file, and assigned analyst. This saves time compared to manual sample verification and eliminates the risk of analyst transcription error.

The outer tube also receives cleared sample lysate for downstream processing. In addition to sample processing, the AutoLys-A tube may be used as a sample collection device, where a sample swab head, piece of fabric, cigarette butt, or other item is directly placed into, and stored within, it. This reduces the need for intermediate manual sample manipulations that may necessitate additional handling and documentation steps, as well as increase the risks of contamination, error, and mishandling.

The AutoLys STAR and AutoLys SAE STAR assay ready workstations are the only automated solutions specifically designed to work with AutoLys-A tubes. The AutoLys STAR is ideal for simultaneous processing of up to 96 biological samples, while the AutoLys SAE STAR is best suited for simultaneous processing of up to 48 mixed sexual assault samples using differential extraction methods. The foundation of both assay ready workstations is an automated liquid handler that achieves superior liquid measurement accuracy, precision and reproducibility across a broad range of volumes, from microliters to milliliters, by means of up to four independent air displacement pipetting channels.

When used with Hamilton Compressed O-Ring Expansion (CO-RE) tips, an air-tight seal is created to maximize liquid handling performance and minimize aerosol generation during tip ejection. The tight seal also enables precise sensing and traceable monitoring to ensure optimum performance when dispensing any type or class of liquid. Pressure-based and capacitive Liquid Level Detection (pLLD and cLLD, respectively) detect the liquid level, while Total Aspiration and Dispense Monitoring (TADM™) detects even slight deviations from pre-defined performance tolerances and Monitored Air Displacement (MAD) detects incorrectly filled wells due to clots or clogs in the pipette tip. Anti-Droplet Control (ADC™) reacts to real-time pressure changes when pipetting volatile organic solutions to prevent drop formation. In addition to liquid handling, CO-RE technology is used with on-deck gripper paddles to enhance functionality by automatically transporting sample plates and tube racks through the workflow steps.

The workstations are pre-configured with tools such as a centrifuge and heater/shaker to increase walkaway efficiencies and also feature AutoLys channels to automatically manipulate the AutoLys-A tubes. In addition to capping, decapping and transporting the AutoLys-A tubes around the deck, these specialized channels lift and lock the inner tube into a "spin basket" position, and also remove and replace it without the need for manual intervention. For laboratories preferring to use tube-based workflows instead of progressing to a microplate format during processing, the assay ready workstations may be optionally configured with the industry's first FlipTube tool that opens and closes the lids of Hamilton's FlipTube microtube without manual intervention.

The assay ready workstations may be integrated with any laboratory information management system (LIMS) for automatic evidence accessioning and/or worklist generation, and an autoload capability includes 2D barcode scanning to verify detailed sample information, including analyst and case number, along with correct positioning of the sample on the deck. Pre-programmed automated methods simplify use and also reduce the time and effort required to internally validate the automated workflow, while password-protected lockout protocols prevent unauthorized or accidental changes. In operation, user-friendly and interactive run-setting dialogues from the integrated VENUS software guide users of any skill level through instrument setup and operation. Once the automated workflow is complete, a run file containing details on each sample type, location and action is sent back to the LIMS where it may be stored and output as a standardized form for use in a case file report.

By incorporating AutoLys-A tubes and the AutoLys STAR or AutoLys SAE STAR assay ready workstation into forensic DNA sample analysis workflows, risks of manually-derived errors, variability, and contamination are eliminated, sample integrity is strengthened, and sample processing throughput is increased. In addition to also reducing active analyst time during processing, the automated methods also reduce the numbers of analyst errors, and hence the amount of time spent on quality review. As active time devoted to sample processing is significantly reduced, analysts are free to focus on higher value activities. Beyond sample processing efficiencies, automated generation of run file details in a standardized output format reduces active time required during casework documentation review to further contribute to overall laboratory efficiencies.

Eliminating Bottlenecks in Multiple Applications

The automated workflow, using AutoLys-A tubes and the AutoLys or AutoLys SAE STAR assay ready workstation, is beneficial in any recent or cold case criminal investigation involving collection of forensic DNA, even among different sample types; and is especially useful in processing complex, mixed samples from sexual assault cases. In fact, when processing sexual assault evidence involving a mix of epithelial (victim) and sperm (subject) cells, the automated AutoLys workflow flexibility extends to multiple processing methods, including newer ones such as affinity capture of unique sperm proteins, nuclease-based digestion, and matrix derived separation, as well as traditional methods such as the differential extraction method first detailed by Peter Gill and colleagues in 1985[1].

Although the Gill method is commonly used in forensic laboratories, the variety of sample manipulation steps makes it a time-consuming and labor-intensive process. Slight modifications to the differential extraction method were recently published by Mark Timken and colleagues that improve efficacy, and automate the process, while including additional workflow steps[2,3].

Applying the Automated Forensic DNA Typing Workflow

Here, we demonstrate performance of the automated workflow compared to manual processing in the context of differential extraction prior to analysis by automated short tandem repeat (STR) genotyping. Two sample types were processed and analyzed: mock sexual assault swabs prepared with semen and vaginal cells, and authentic post coital swabs collected at several time points.

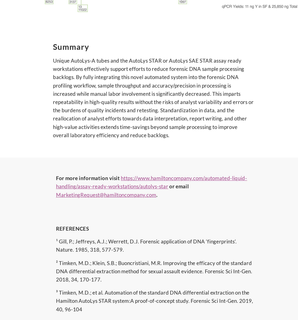
In the automated workflow, the AutoLys SAE STAR software guides analysts through the modified Gill method setup, including where to place consumables and prepared reagents and also automatically calculates reagent volumes where indicated. Swabs are inserted into AutoLys-A tubes, loaded onto a 24-sample AutoLys rack, and placed onto the AutoLys SAE STAR deck. The AutoLys SAE STAR automatically decaps each tube, adds lysis reagent, recaps each tube, then moves each to an on-deck heater shaker. After heated incubation with shaking, each AutoLys-A tube's inner tube is automatically lifted and locked, then the assembly is automatically transferred to an on-deck centrifuge to separate the swab from the liquid and pellet unlysed material consisting of mostly sperm cells. The supernatant, or non-sperm containing fraction (NSF; containing epithelial cell DNA) is transferred to a 96-well microplate, while the remaining pellet is resuspended in buffer as the sperm fraction (SF) then transferred to a 96-well microplate pre-loaded with lysis reagent. NSF and SF fractions may also be transferred to Hamilton's FlipTubes instead of microplates according to laboratory-specific preferences. The SF microplate is automatically transported for heated incubation with shaking, then centrifuged to pellet the sperm cells and washed twice to remove any residual material. Sperm cells are then lysed, and SF DNA is transferred either to the 96-well microplate containing the corresponding NSF fractions, or to individual FlipTubes for further processing. In this example, capillary electrophoresis was performed on the sample fractions after processing, and they may also be prepared for use in massive parallel sequencing (MPS) workflows.

In the manual workflow, swabs are placed in tubes, lysis reagent is added, and the tubes are manually transferred to a heater shaker. Following incubation, each sample is manually vortexed, then each swab is removed, transferred to a separate spin basket and centrifuged to pellet unlysed material consisting of mostly sperm cells. The NSF supernatant is manually removed, and the SF pellet is washed multiple times, lysed, and collected for further analysis.

Figure 2A:



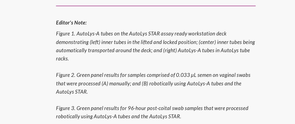
Figure 2B:



Per **Figure 2**, DNA quantification and STR typing analysis were performed on samples containing male and female cellular DNA that were processed manually (**A**) and robotically (**B**) using AutoLys-A tubes and the AutoLys STAR. STR profiles indicate comparable results among the automated and manual methods. The influence sampling and assay variation may be seen in the two manually processed samples, whereas, sample-to-sample consistency in DNA fragment peak heights was observed in STR profiles generated from those samples processed in the automated AutoLys workflow. Additionally, the automated method enables walkaway processing so that users can focus on higher value activities.

DNA quantification and STR typing were also performed on swabs collected up to 96 hours post-coitus and processed via the fully automated AutoLys workflow (**Figure 3**), further demonstrating robustness in the automated workflow when processing challenging samples.

Figure 3:



Summary

Unique AutoLys-A tubes and the AutoLys STAR or AutoLys SAE STAR assay ready workstations effectively support efforts to reduce forensic DNA sample processing backlogs. By fully integrating this novel automated system into the forensic DNA profiling workflow, sample throughput and accuracy/precision in processing is increased while manual labor involvement is significantly decreased. This imparts repeatability in high-quality results without the risks of analyst variability and errors or the burdens of quality incidents and retesting. Standardization in data, and the reallocation of analyst efforts towards data interpretation, report writing, and other high-value activities extends time-savings beyond sample processing to improve overall laboratory efficiency and reduce backlogs.

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Editor's Note:

Figure 1. AutoLys-A tubes on the AutoLys STAR assay ready workstation deck demonstrating (left) inner tube in the lifted and locked position; (center) inner tubes being automatically transported around the deck; and (right) AutoLys-A tubes in AutoLys tube racks.

Figure 2. Green panel results for samples comprised of 0.025 µL semen on vaginal swabs that were processed (A) manually; and (B) robotically using AutoLys-A tubes and the AutoLys STAR.

Figure 3. Green panel results for 96-hour post-coital swab samples that were processed robotically using AutoLys-A tubes and the AutoLys STAR.

Presumed Guilty:

Exonerating the Wrongfully Convicted

Ken Doyle, Promega

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"It's about the most horrific thing that could ever happen. I was sitting [in the courtroom] and everything went kind of tunnel-like. I didn't see anything. I didn't hear anything. All I heard was the judge say those words, 'The sentence will be death.' "



In 1985, Kirk Bloodsworth was given the death sentence for the rape and murder of nine-year-old Dawn Hamilton, in Rosedale, Maryland. A year earlier, Hamilton's body was found in a wooded area near her home. Law enforcement officers interviewed two boys who were fishing nearby and were the last to see Hamilton alive. They described her entering the woods, accompanied by a skinny man with curly blond hair. Other residents recalled seeing a man with curly blond hair in the vicinity of the murder that day.

Based on an anonymous call in response to a sketch of the suspect, police interviewed Bloodsworth. He had abruptly left town to escape a failing marriage, and police surmised that his departure was related to the murder. Even though his physical appearance was different from the eyewitness descriptions—he had red hair and weighed over 200 pounds—the police made Bloodsworth their primary suspect. He was convicted based on eyewitness testimony, despite two of the witnesses not being able to identify him during a police lineup, and the lack of any physical evidence connecting Bloodsworth to the crime scene.

Although Bloodsworth appealed his sentence in 1986, his conviction was upheld in 1987. The sentence was reduced to life in prison. After spending over 2 years on death row and a total of almost 9 years in prison, Bloodsworth was finally exonerated in 1992 based on DNA testing. In 2003, the real killer was identified as Kimberly Shay Ruffner—an inmate in the same prison as Bloodsworth. Ruffner had a history of sexually assaulting young girls, and he had been released from prison at the time of Hamilton's murder.

Since his exoneration, Bloodsworth has worked as an advocate on behalf of those wrongfully convicted. His efforts resulted in the adoption of the Kirk Noble Bloodsworth Post-Conviction DNA Testing Program block grants signed into law in 2004, as part of The Innocence Protection Act , and the 2013 abolition of the death penalty in Maryland.

The Long Road to Exoneration

Following the Numbers

Ever since Bloodsworth's case—the first death-row exoneration based on DNA testing—the number of exonerations in the US has grown rapidly. According to the National Registry of Exonerations, as of June 6, 2019, there have been 2,960 exonerations starting from a landmark case in 1989. That year, Gary Dotson was exonerated of a rape conviction from 10 years earlier. A PCR-based test proved his innocence, after earlier DNA restriction fragment length polymorphism (RFLP) analysis had failed. As it turned out, the rape had never occurred. The reported victim, who was 16 years old at the time, had fabricated the rape story based on a novel she had read. She admitted wanting to cover up the possibility of becoming pregnant after having sex with her boyfriend the previous day.

The exonerations tracked by the registry reveal the high price paid by victims of wrongful convictions: an average of 8.8 years of their lives lost per case. Of those cases, 122 exonerees were serving death sentences. Although DNA evidence is increasingly used to solve cold cases, it still accounts for a relatively small proportion of overall exonerations (23 out of 159 in 2018).

Bloodsworth's case has garnered considerable publicity over the years. A Maryland attorney, Tim Junkin, recounted the story in his book, *Bloodsworth: The True Story of the First Death Row Inmate Exonerated by DNA Evidence*, published in 2004. In 2015, a documentary feature film, *Bloodsworth: An Innocent Man* directed by Gregory Bayne chronicled Bloodsworth's arduous journey through the criminal justice system. The case was also profiled in a YouTube web series, *Murder with Friends*, in 2018. Bloodsworth gave the keynote address in 2016 at the 26th International Symposium on Human Identification.



The Central Park Five

Some earlier wrongful conviction cases are capturing recent media attention. A high-profile example is the case involving a group of then-teenagers known as the Central Park Five. The release of a Netflix miniseries in May 2019, and a subsequent interview by Oprah Winfrey, has propelled the case back into the spotlight. The story was chronicled previously in a Ken Burns documentary at the 2012 Cannes Film Festival.

In the spring of 1989, five teenagers were arrested in connection with the rape and assault of a woman in the northwestern corner of Manhattan's Central Park, as well as a series of other assaults in the area reportedly committed by a group of youths. The brutal attack left the victim in a coma for several days with a fractured skull. Although the Central Park Five initially confessed during interrogation after arrest, the confessions were later withdrawn and ascribed to coercive investigative techniques. Despite a lack of a DNA match between semen found on the victim and any of the teenagers, and the evidence being deemed inconclusive, the Central Park Five were convicted in 1990 on several counts including rape, assault, robbery, and attempted murder. They received prison sentences ranging from 5 to 15 years.

In 2002, a convicted murderer and serial rapist, who was serving a 33-year prison term, confessed to the Central Park rape and assault, further stating that he acted alone. The case was reopened and additional DNA testing provided a match between the confessed rapist and the victim. The Central Park Five's convictions were vacated by the New York Supreme Court in December 2002.



The Innocence Project

Many wrongful conviction cases, however, do not attract the same level of media attention as the Central Park Five. The time and resources required to appeal a conviction can be considerable. That's why organizations like The Innocence Project exist.

A study by the US Department of Justice and the US Senate, in collaboration with the Benjamin N. Cardozo School of Law at Yeshiva University (New York City) found that incorrect eyewitness identification was a factor in over 70% of wrongful conviction cases. Prompted by the study, two professors at Cardozo Law—Barry C. Scheck and Peter J. Neufeld—founded The Innocence Project in 1992. Their original mission was to assist prisoners who could be proven innocent through the use of DNA testing methods. As of June 2019, The Innocence Project has freed 195 wrongfully convicted individuals.

The pioneering efforts begun by The Innocence Project soon expanded into a network of organizations across the US and internationally. The first Innocence Network Conference was held in Chicago in 2000. The network describes itself as a loose affiliation of independent nonprofits, as well as organizations affiliated with law schools or other educational institutions, units of public defender offices, and pro bono sections of law firms. These organizations (55 in the US and 12 non-US in June 2019) are united in a common endeavor—providing pro bono legal and investigative services to individuals seeking to prove their innocence. Further, the network aims to redress the causes of wrongful convictions through education and advocacy.

Persistence Pays Off

Although DNA testing methods themselves can provide answers in a relatively short time frame, reopening a case and tracking down suitable samples for DNA testing can pose its own challenges.

In June 2019, The Innocence Project listed 375 cases of wrongful convictions on their web site. The organization successfully overturned five wrongful convictions in 2018. For Malcolm Alexander, that intervention meant bringing him justice after 38 years of incarceration, the longest sentence served to date by an exonerated client of The Innocence Project.

Alexander was arrested in connection with a rape that had been committed in November 1979. The victim, who owned an antiques store in Gretna, Louisiana, was raped by an assailant who grabbed her from behind and held a gun to her head in a dark bathroom at the back of her store. Due to the assailant being behind her for the entire duration, the victim's opportunity to view him was extremely limited.

In 1980, Alexander had a consensual encounter with a woman who later asked him for money and then accused him of sexual assault. As a result, Alexander's photo was used in a photo array for the victim in the Gretna case. Although the victim made a tentative identification, her confidence was later recorded as "98 percent sure" and Alexander was arrested. Blood type testing of the rape kit, although available, was not requested. Further, Alexander's paid attorney—who was later disbarred for misconduct in Alexander's and several other cases—failed to make crucial court appearances and to file important documents.

The Innocence Project agreed to take Alexander's case in 1996. However, they were soon faced with a seemingly insurmountable roadblock: the rape kit and a semen-stained towel had been destroyed four years after Alexander's conviction. Finally, in 2013, hair evidence recovered from the crime scene was found at the local crime lab. In collaboration with The Innocence Project New Orleans, DNA testing of the hairs proved that they all had the same profile that did not match DNA from either the victim or Alexander. Eventually, Alexander's conviction was vacated in January 2018.

What are the main causes of wrongful convictions, and how can the criminal justice system address these causes? As highlighted by The Innocence Project, incorrect eyewitness identification contributes to the majority of these cases. However, some cases raise questions about the reliability of fundamental forensic techniques themselves.

Rebuilding the Foundation of Forensic Science: The NAS Report

Ten Years of Reform

In 2009, under a directive from the US Senate, the National Research Council of the US National Academy of Sciences (NAS) published a report entitled *Strengthening Forensic Science in the United States: A Path Forward*. The committee behind the development of the NAS Report included experts across a variety of disciplines, including law, chemistry, molecular biology, engineering, forensic science, computer science and statistics. The report recognized that, while there are many talented and dedicated professionals in the forensic science community, they often face challenges due to lack of resources, sound policies and national support. The goal of the report was to provide recommendations that would "improve the forensic science disciplines and to allow the forensic science community to serve society more effectively." During the preparation of the report, the committee heard presentations from a variety of forensic practitioners, forensic laboratory managers, teachers, forensic researchers, legal professionals and members of law enforcement agencies.

After consideration of all the testimony and evidence presented, the committee found a consistent thread that ran through all their deliberations: the forensic science system suffered from problems that could only be addressed by a national commitment to overhaul the system and develop national standards, as well as a significant infusion of federal funds.

The NAS Report made wide-ranging recommendations, from the establishment of a National Institute of Forensic Science, to forensic laboratory accreditation and certification measures, to researching sources of human bias in interpreting forensic evidence. Not surprisingly, it received a mixed reaction from members of the forensic community.

"These [reactions] included surprise, disbelief, resentment, anger and indifference," says Susan M. Ballou, 2018-2019 President of the American Academy of Forensic Sciences, in an editorial marking the ten-year anniversary of the NAS Report. Despite the initial reaction, Ballou notes, "the community took heed and focused on the 13 recommendations." The editorial concluded that the forensics community still faces challenges but considerable progress has been made to address the NAS Report's recommendations.

The Hon. Harry T. Edwards co-chaired the committee responsible for producing of the NAS Report. Judge Edwards is currently a Senior US Circuit Judge, chief judge emeritus of the US Court of Appeals for the District of Columbia Circuit in Washington, D.C. and professor at the New York University School of Law. He issued a statement in February 2019 that reflected on the progress made since the publication of the report.

In his statement, Judge Edwards discusses the impact of the NAS Report on the use of forensic evidence in court, current attempts to reform shoddy forensic practices, and the exoneration of persons wrongfully convicted on the basis of faulty forensic evidence. However, he notes that much is still to be done, especially toward the establishment of a national, independent, federally funded body to oversee the forensic science disciplines.



The Role of DNA Testing

Why were the recommendations of the NAS Report controversial? The report challenged the scientific validity of long-standing forensic techniques that were in common use across the country. In particular, the report drew attention to "pattern evidence"—expert interpretations of observed patterns at the crime scene that are matched to the suspect. Such evidence includes shoe prints and tire marks, bite marks, tool marks, fingerprints, handwriting, hair and bloodstain patterns. In fact, the report stated that no forensic method, when subjected to rigorous analysis, was able to consistently and accurately demonstrate a connection between evidence and a specific individual, with one exception: DNA analysis.

DNA-based forensic methods form the cornerstone of efforts aimed at reversing wrongful convictions. At ISHI 29, Greg Hampikian, Ph.D. presented Probabilistic Genotyping: Undoing Wrongful Convictions. Hampikian is a Professor of Biology and Criminal Justice at Boise State University and the Executive Director of The Idaho Innocence Project. He has testified in court as a DNA expert in many cases involving wrongful convictions.

Hampikian explains that probabilistic genotyping has been the most useful method currently available for overturning wrongful convictions. This technique uses sophisticated computer software to examine the DNA profiles of all contributors to a sample and then determine the likelihood of a match to a specific individual. "We have also successfully used other technologies like the new, more sensitive DNA profiling kits and expanded Y-STR testing," he says. Although genealogical testing with Y-STR profiling has been in use for some time, Hampikian observes that the method has gained new significance with the introduction of public databases of single-nucleotide polymorphisms (SNPs). "It is amazing," he says, "that these home tests, consumer genealogy kits, are not yet available in any crime lab but are solving many cold cases."

However, even DNA methods are subject to scrutiny, not because the methods themselves are flawed, but because the samples are mishandled or the procedures are not carried out correctly. "Faulty DNA practices are starting to take a toll," Hampikian says. According to him, practices that muddy the waters of DNA analysis include "unreliable complex DNA mixture analysis, contamination of minute quantities of DNA, and the drive for ever greater lab efficiency at the cost of cutting corners—like processing DNA samples from suspects right next to the evidence." Hampikian stresses that these errors can be minimized through the use of good laboratory practices and common sense, such as processing all evidence samples to completion before a reference DNA samples is brought into the laboratory area.

With a large potential number of wrongful convictions, each Innocence Project has a defined set of criteria to review before accepting a case. "We get about a hundred letters per year from Idaho prisoners requesting help," Hampikian says, "and an equal amount from other states or overseas." Once a case is accepted, the first steps are often the most challenging: identifying evidence and getting permission to test it. Despite the challenges, each Innocence Project is committed to common goals: freeing those who have been wrongfully convicted and reforming the criminal justice system responsible for these wrongful convictions.

After Exoneration: The Path Forward

What's next for those who have been exonerated? Like Kirk Bloodsworth, many of them become advocates for justice, fighting for other prisoners to have the same opportunity to prove their innocence. In addition, they work to ensure that those who are wrongly convicted will never have to face the death penalty.

Witness to Innocence (WTI) is the only US organization dedicated to empowering exonerated death-row survivors to be the most powerful and effective voice in the effort to abolish the death penalty. The nonprofit organization is composed of and led by exonerated death-row survivors and their family members. It was founded in 2003 by Sister Helen Prejean, internationally renowned anti-death penalty activist, and Ray Krone, the 100th person exonerated from death row in the US.

In addition, WTI serves as a support network for those exonerated and released from death row. Many of these individuals suffer from mental and physical health issues, and they lack access to re-entry services. They also face financial difficulties and limited opportunities for employment. As part of its advocacy efforts, WTI has launched a campaign to win financial compensation for these exonerees, by testifying before key Congressional committees, developing public outreach efforts and collaborating with others who have been wrongfully convicted.

These days, Kirk Bloodsworth finds time, among his numerous advocacy and outreach efforts, for another activity: making jewelry. In his suburban Philadelphia home, Bloodsworth practices his silversmithing craft under a company named "Bloods Stones". Among other pieces of fine jewelry, he creates items that have a personal meaning for him: DNA pendants and exoneree rings. The rings are destined as gifts for all those wrongfully convicted who went through the same tortuous process that he did.

Bloodsworth maintains the same passion for his craft as he does for his work with WTI. "We're all going to meet an end," he says. "So what are you going to do while you're waiting?" That's something worth pondering for each one of us.

The Recovery of Human Touch DNA from Poached Rhinoceroses

M.M. Manqana, Prof. J.B. Grobler, and Dr. K. Ehlers,
University of the Free State

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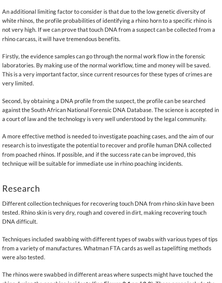
Introduction

In recent years, rhino poaching has increased dramatically in South Africa. This illegal activity is predominantly driven by the growing demand for rhino horn. Poaching cases can be extremely difficult to investigate and prosecute due to the nature of the evidence available at the scene.

To address this challenge, additional investigative tools are needed. At the University of the Free State, we are currently focusing our research on how to optimize the chances of obtaining human touch DNA from the suspects collected from rhino carcasses found on the crime scene.



Current practices include collecting rhino DNA samples and storing them in a DNA database called RHODIS. This enables law enforcement agencies to link a rhino horn back to a specific rhino or the poaching site.

However, very few laboratories are equipped to handle animal evidence, and those that are generally charge accordingly. The marker sets have to be developed in-house, since commercial kits are not available.

An additional limiting factor to consider is that due to the low genetic diversity of white rhinos, the profile probabilities of identifying a rhino horn to a specific rhino is not very high. If we can prove that touch DNA from a suspect can be collected from a rhino carcass, it will have tremendous benefits.

Firstly, the evidence samples can go through the normal work flow in the forensic laboratories. By making use of the normal workflow, time and money will be saved. This is a very important factor, since current resources for these types of crimes are very limited.

Second, by obtaining a DNA profile from the suspect, the profile can be searched against the South African National Forensic DNA Database. The science is accepted in a court of law and the technology is very well understood by the legal community.

A more effective method is needed to investigate poaching cases, and the aim of our research is to investigate the potential to recover and profile human DNA collected from poached rhinos. If possible, and if the success rate can be improved, this technique will be suitable for immediate use in rhino poaching incidents.

Research

Different collection techniques for recovering touch DNA from rhino skin have been tested. Rhino skin is very dry, rough and covered in dirt, making recovering touch DNA difficult.

Techniques included swabbing with different types of swabs with various types of tips from a variety of manufactures. Whatman FTA cards as well as tapelifting methods were also tested.

The rhinos were swabbed in different areas where suspects might have touched the rhino during the poaching incidents (See **Figure 2.1 and 2.2**). These areas include the back, rump, ears, legs, head and horns.

Prescribed regulations from the SAPS regarding proper protective equipment was utilized during the entire handling of the samples. The samples were labelled, packaged in sealed perforated exhibit bags and kept until processing at the University of Free State.



Figure 2.1. Forensic analyst swabbing the rump/ back of a rhino during a dehorning procedure in Port Elizabeth.



Figure 2.2. Forensic analyst swabbing the head and ears of a rhino during a dehorning procedure in Port Elizabeth.

The samples were processed using the Casework Direct Kit, Custom from Promega. DNA was eluted from the swabs following the procedure described in "processing of swabs".

The FTA cards and tapelifts were cut into small pieces and placed into extraction tubes.

Afterwards, the samples were amplified by using the PowerPlex® ESI 16 System from Promega, which offers a Direct Amplification of DNA from swabs method.

At this stage, we were able to obtain mixtures as well as partial profiles. These results are acceptable in the court of law, although they cannot be included on the National Forensic DNA Database.

Preliminary results indicated that both the Floq swabs and the tape lifts yielded reliable results, but due to the work environment and surface area of the rhino skin, tape lifting proveded to be the better option for sample collection. The dry and rough skin surface of a rhino sometimes disintegrated the swab during collection.

The preliminary study suggests that it is advisable to attempt the recovery of touch DNA using the collection method such as swabs and tape lifts, irrespective of the weather conditions.

The research is still undergoing where methods of collection as well as DNA process are being optimised to collect the maximum amount of DNA available on the rhinos.

The recovery of human touch DNA from evidence retrieved from wildlife crimes may provide a key identification tool for linking or excluding suspects. This is a step forward in combating wildlife crime and can be used to for education, and to deter potential poachers.

**** Appendix A: See attached profile images read from Genemapper IDX of the results of human touch DNA profiles recovered from the Rhinos.**

APPENDIX A: Shows results which yielded full profile mixture profiles on the Genemapper IDX software.

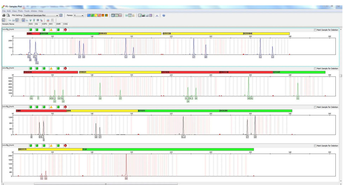


Image 1: Mixture profile obtained from human touch DNA collected from a rhino ear using Floq swabs.

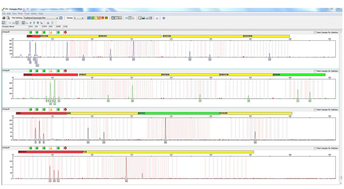


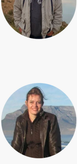
Image 2: DNA profile obtained from human touch DNA collected from a rhino horn using TapeLift.



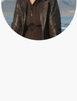
Matthews Mthethelelo Manqana possesses a BSC Degree in Pure and Applied Biochemistry obtained at the University of KwaZulu Natal and an Honours Degree in Forensic Genetics obtained at the University of Free State, where he initiated and completed a research study to prove the possibility of obtaining DNA profiles from condoms left on crime scenes. He is currently studying towards a Master's Degree in Forensic Genetics at the University of Free State, where developing a new forensic science technique in touch DNA will (if successful) lower rhino poaching through increased incarceration rates.

Mthe has worked for the South African Police Service, in the Forensic Service Division since August 2009. During his employment, he has worked as an Evidence Recovery Team Leader, DNA Reporting Officer, and is currently working as a Crime Scene Examiner.

Mthe has also been elected as a member of the Forensic Science Laboratory Internal DNA Oversight Committee. He was delegated to attend the 3rd Annual African DNA Forensic Conference and the 1st National Forensic Service Conference. He submitted a poster presentation for the 3rd National Forensic Service Conference about the possibility of obtaining DNA profiles from condoms left on crime scenes and was a speaker delegate during the 4th Forensic Service Conference, discussing applying forensic science techniques in touch DNA to rhino poaching cases.



Professor Paul Grobler has been studying aspects of Population and Conservation Genetics for three decades. His research is focused on genetic diversity in fragmented populations, gene flow and genetic connectivity among populations, hybridization, the genetic implications of selection for unusual phenotypes, and wildlife forensics. He is currently head of the Department of Genetics at the University of the Free State and also leads the Evolutionary Genetics team in the Department.



Dr. Karen Ehlers' research initially focused on an individual-based approach to the genetic management of wildlife species in South Africa. Since 2010, due to the high crime rate in South Africa, the establishment of the National Forensic DNA Database of South Africa and the need for trained forensic DNA analyst, her focus moved on to the development of a training program in forensic science and continuing with research focusing on Y-STRs, touch DNA and forensic entomology.

The University of the Free State established a B.Sc degree in Forensic Sciences and postgraduate qualifications (up to a PhD level) in Forensic Sciences, Forensic Genetics, Forensic Chemistry and Forensic Entomology. Dr. Ehlers was appointed as the Program Director of Forensic Sciences at the University of the Free State in 2016. In 2015, she was appointed by the Minister of Police to serve as a member of the National Forensic Oversight and Ethics Board of South Africa. The Board was established as part of the DNA Act that became operational in January 2015. The function of the Board was to monitor the implementation of the DNA Act, provide oversight over the processes relating to obtaining and analysing DNA profiles, and to handle complaints about alleged violations relating to the abuse of DNA samples and profiles.

Currently, Dr. Ehlers also serves on the GHREC (General Human Research Ethics Committee), SREC (Senate Ethics Committee) at the University of the Free State, and the Research, Teaching and Learning, and Executive Committees within the Department of Genetics.

What Does the Future Hold for Forensics?

Athina Vidaki, Erasmus University Medical Center
Tara Luther, Promega

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Since the late 1980s forensic DNA typing has undoubtedly been developed as a powerful tool in police investigations for identifying perpetrators of crime or missing persons, via the analysis of autosomal, Y-chromosome or mitochondrial DNA markers. But is this all that we can expect from forensic genetic testing? Certainly not!

As a result of vast scientific and technological advancements over the last few years, the field of forensic genetics is developing fast. Hence, we expect that a wide range of new methods and technologies will soon be added to the next-generation forensic DNA toolkit. Which are these methods?

The panel discussion at ISHI 30, led by Athina Vidaki of Erasmus University Medical Center, will feature highly recognized experts who will present some of the most promising forensic science topics and technologies likely to be introduced in the coming years; more specifically in the fields of microbial forensics, forensically relevant body fluid/tissue identification, forensic DNA phenotyping and genetic genealogy.

Firstly, microbial communities can reveal answers to important questions risen during forensic investigations; for example, by examining microbial succession during the decomposition of a dead body we can estimate the time since death, in others words the post-mortem interval. How accurate is this microbial clock of death?

Researchers at Colorado Mesa University are looking to prove that microbes are predictably found at certain times during the decomposition process. Doing so would allow crime scene investigators to rely on this "microbial clock" to help estimate time of death, and potentially the cause.

Currently, investigators rely on the postmortem interval, or estimates of the time since death, to begin to determine what happened to a victim and to authenticate a potential suspect's alibi. Factors contributing to the postmortem interval include activity on the victim's credit card, when they were last seen alive, and the state of the body. In certain cases, insect species found on the body can be a clue as well, but it's not possible to rely on insects alone.

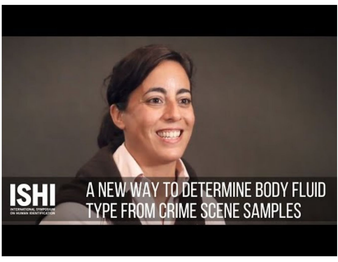


The term "microbial clock" originated from Jessica Metcalf, a microbial ecologist and evolutionary biologist at Colorado State University who leads the FIRS project. In 2010, she decided to shift from using DNA to study Ice Age mammals to working with ancient humans, specifically understanding their gut microbes by studying feces.

During her research, Metcalf thought it wise to gain knowledge on the microbes involved in decomposition. In a study completed in 2013, Metcalf was able to show that microbial successions were consistent across different human bodies and different seasons, even when accounting for seasonal temperatures. Metcalf's work should allow forensic investigators to uncover how long ago a person had died, to within two to four days, by swabbing and sequencing the microbes that exist on and around the body.

Also, forensic transcriptomics have shown great capacity to reveal tissue-specific patterns, that can be used to provide valuable 'source level' information for the police. Can the issue of inter-individual gene expression variation be solved by the inclusion of more tissue-specific mRNA markers in targeted messenger RNA-based sequencing methods?

In the video below, Joana Antunes of Florida International University describes how forensic laboratories may soon be able to use methylation markers in DNA to determine body fluid type without destroying the sample collected.



Furthermore, the panelists will discuss the application of massively parallel sequencing for developing next-generation forensic tools, for example for the combined and high-resolution appearance and ancestry prediction. We will also explore the recent application of epigenetics for estimating one's chronological age in tissues like blood. How far are we from a complete picture of an unknown individual?

In an interview with ISHI, Walther Parson, a member of VISAGE (Visual Attributes Through Genomics) project explained, "Currently, the most promising forensically relevant predictors are appearance, ancestry and age. These have been developed, investigated and interpreted in the past 10 years using different technologies. VISAGE aims at combining these and harmonizing technologies and interpretation. The main technological platforms are based on Massively Parallel Sequencing (MPS)."

These tools are on the horizon for forensic laboratories. Walther continues, "VISAGE is developing and validating two sets of molecular tools, the basic and the enhanced tools. The former consists of known and mostly published markers and will become available in 2019, the latter includes new markers and is scheduled to become available in 2020."

For more on how phenotyping works, watch our interview with Ellen Greytak on generating a suspect's mugshot solely from DNA.



Lastly, although its precursor – familial DNA searching – has been successfully used since 2003, forensic 'genealogics' has recently been in the public spotlight due to its controversial use of public genetic databases. Long-range familial searches from databases holding millions of DNA profiles can be powerful by providing the missing link in high-profile cold cases like the recent arrest of the alleged Golden State Killer. But what about the extensive potential privacy invasions - are we all under scrutiny?

Editor's Note: for more information on investigative genealogy, see our article in the April, 2019 edition *of The ISHI Report*

How have the aforementioned tools been developed and what are the prerequisites for their accurate use and interpretation? Despite their high potential, bringing these new forensic science technologies into the justice system will entail overcoming a wide range of scientific, technological, investigative, ethical and legal challenges. During this panel discussion our experts will share more about these topics and the wider picture of what the future holds for forensics. You don't want to miss it!

The full agenda for the 30th International Symposium has been released!

Learn More

Meet the ISHI Staff

Have you ever wondered who the team behind the International Symposium on Human Identification is? Click the buttons below to get to know us a little better.

Not pictured, our international colleague, Nicole Siffling.

Meet Nicole



Predict the Future - Get a Bumper Sticker



Forensic science is always advancing. Technologies that seemed futuristic years ago are now commonplace. What do YOU think will be the most significant advances in forensic science in the coming years? Provide your prediction in a 30 second or less video clip and receive a cool forensic science bumper sticker for your effort (see below).* Wild, silly and outlandish ideas are encouraged. Individual or group submissions are welcome.

Submissions must be received by August 31, 2019 to be eligible. Selected submissions will be displayed at ISHI 30 and may also be shared on the ISHI website (www.ishinews.com), and ISHI social media channels.

**We apologize but we are not able to ship bumper stickers outside of the United States.*

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Melinde Lutz Byrne

Consulting Forensic Genealogist

GEDmatch has recently changed all uploaded profiles in their database to a default opt out for searches by law enforcement. How do you see this impacting the number of cases solved using genetic genealogy in the future?

GEDmatch opting out all eligible kits resulted in 0 law enforcement matches on their site for about 24 hours in May. Law enforcement cases resumed being solved there the next day when the opt-in buttons were installed. Some cases will not be viable, perhaps for years, and many kits will never be opted in, especially those owned by people who have died. It may never be possible to fully assess this – akin to the Sorenson Molecular database loss years ago. That said, targeted testing and the use of other sites will more than accommodate the slack in the short run and until the next change at GEDmatch, its usefulness will only increase over time.

Is there an upside to the GEDmatch change? For example, does this alleviate privacy concerns?

The upside of the GEDmatch auto-opt-out is that it made the international news. Although an unknown number of individuals took down their kits, the opt-in recovery has had informative patterns. A startling number opting in, in excess of 25%, are new transfers to GEDmatch from direct-to-consumer test takers who had not sent their kits previously. The additional media coverage had a positive effect on the two GEDmatch owners, who had not created their site with law enforcement uses in mind.

The change did nothing to alleviate privacy concerns, it heightened them, particularly in communities like followers of a few genealogical bloggers. The tiny numbers of African Americans and EU residents who have opted in to law enforcement permissions show that the discussion surrounding the change alarmed people who have good reason to fear government misbehavior. In real life, if you are risk averse to real dangers you should not test, let alone post. Since its inception, GEDmatch said this very clearly. Changes to that concise statement have done them considerable harm. Law enforcement searches, usually done by civilian genealogists, have been non-intrusive, exonerated countless people, and anecdotally deterred criminals who know they will be caught.

Should a reduction in the number of profiles available for searches discourage labs that might be considering implementation of investigative genealogy techniques?

I use techniques that meet Board for Certification of Genealogists (BCG) standards for results that meet the Genealogical Proof Standard (GPS). Regarding profiles, if you think of the number of profiles as lottery odds, you will probably fail. You need two matches to triangulate on an unknown sample. They need to be the right two matches. As the numbers grow daily, monitoring for new matches has been rewarding.

What advice would you give to individuals with profiles in GEDmatch who are weighing whether or not to opt to searches by law enforcement?

Here's what I've told over 4000 Boston University students. Learn the facts, evaluate your sources, then apply your own ethical compass. In my opinion, every human has the right to know where s/he comes from. That knowledge does not include the right to confront biological parents or children – they have their own rights not to be outed or shamed, accosted or given unwelcome attention, especially if they were guaranteed anonymity through adoption, reproductive donation agreement, or court order. In my opinion individuals have the right to test their own DNA and put it intentionally anyplace they want to. Relatives of any degree have no standing in that decision. Informed consent is useless if the informer is your only source. If someone tries to coerce you, walk away. Do no harm. Sometimes doing nothing causes harm.

Are there other databases that law enforcement is using for genealogical searches? Are they comparable to GEDmatch?

In some jurisdictions, CODIS is available for extremely limited familial matching with STR. Some companies, like Parabon, made calls for the public to test for their company databases.

Law enforcement has proactively gathered targeted samples in some jurisdictions, notably upstate New York, from the families of missing children and adults for a local initiative, likely STR-based. Nancy Jo Scamurra, Amherst, NY, was immediately found with that approach in 2017. She walked away in 1984, never came back, parents waited (mother died waiting), LE came in 2017 asking for samples, immediate hit. Nancy Jo had been found 13 days after she went missing. Her headless torso was fished out of Lake Ontario, a short distance away but in a different police jurisdiction.

All but one direct-to-consumer testing company with a primarily-genealogical database have zero permissions in place. All conform in some way to GDPR and will respond to a subpoena, but do not give in-site opt-in choices to their customers. Only testing company FTDNA has an opt-out button as of this writing. On a case by case basis, law enforcement entities may search for murderer, sexual assault, and unknown dead identities on their 1M plus kit database. FTDNA is also the only large testing company that maintains projects for mtDNA and Y DNA test takers.

A number of service/specialty labs are now offering a genetic genealogical service. Is this a technique that can realistically be brought in house to most forensic labs? What would be the benefit of outsourcing vs. doing the work in house?

In the spirit of full disclosure, I am a board-certified consulting forensic genealogist for Bode Technology. In my opinion, few service/specialty labs have anyone with sufficient genealogical experience to get effective results in diverse cases. It starts with a lab familiar with testing far beyond just clean samples with a lot of DNA. All my genealogical team members have more than ten years' experience. There is an initially unchallenging introduction to the required skills, followed by a very steep learning curve.

Some detectives have, with coaching, identified people such as Geauga's Child (Thompson, Ohio). Departments that do not have dozens of such cases are unlikely to find it affordable in detective time to train individuals for a one-off exercise. The ROI for inhouse training is low, especially for the long-cold cases where thousands of hours have already been spent and no traditional clue found. Outsourcing can connect at a fixed fee with experts who are deeply committed to the work and determined to name the sample. As one genealogist told me recently, "It's not ok with me that this guy is still out there raping." Their fresh passion to solve the case is invaluable.



GEDmatch has recently changed all uploaded profiles in their database to a default opt out for searches by law enforcement. How do you see this impacting the number of cases solved using genetic genealogy in the future?

I think our current situation is much like how life was when the first digital music devices became available. If you had one, it was difficult to get music onto it, it just wasn't readily available. That is how are databases are now. Small, clunky, hard to access and use. But just like digital music has completely become the norm for nearly everyone, this tool of genetic genealogy will grow and become easier to access and use for law enforcement.

Is there an upside to the GEDmatch change? For example, does this alleviate privacy concerns?

Definitely. These early stages of integrating this technology into law enforcement are crucial. We need to take a step back and make sure we are moving forward in a way that is ethical and sustainable.

Law enforcement might be the first to put the genetic genealogy database to use outside of the intended genealogy industry, but they certainly won't be the last. Because we have no idea where the world of genomics will go in the future it is important to set a precedent for its use now. That means that no person or company should get to decide how your genomics data is used without your express consent.

Should a reduction in the number of profiles available for searches discourage labs that might be considering implementation of investigative genealogy techniques?

Absolutely not. After all, you don't need a million samples to solve your case. You only need a few. And perhaps the few you need are already there in the database.

What advice would you give to individuals with profiles in GEDmatch who are weighing whether or not to opt to searches by law enforcement?

My biggest concern is regarding those who have uploaded profiles for other people. We need to make sure that everyone is able to make their own decision.

They also need to realize that their actions could have ramifications for close family members. I think everyone wants to help make our communities safer, but we have to recognize that it may come at a sacrifice of some of our own personal relationships.

Are there other databases that law enforcement is using for genealogical searches? Are they comparable to GEDmatch?

Right now only Family Tree DNA has allowed law enforcement access, and it is much like GEDmatch. But I am working to change that. Stay tuned.

A number of service/specialty labs are now offering a genetic genealogical service. Is this a technique that can realistically be brought in house to most forensic labs? What would be the benefit of outsourcing vs. doing the work in house?

Good question. The answer has two parts: there's the actual lab work, and the analysis, the genetic genealogy work. Both would require significant investment, so I expect we will see outsourcing at first until we know a like more about where this is all headed.



Colleen Fitzpatrick
Margaret Press

DNA Doe Project

Photo Credit: Sara Press Photography

GEDmatch has recently changed all uploaded profiles in their database to a default opt out for searches by law enforcement. How do you see this impacting the number of cases solved using genetic genealogy in the future?

I think the number of cases solved will slow down in the near future, but this will only be temporary. As GEDmatch recovers and as uploads to FTDNA increase, the number of solves will pick up again. However I think that the rate of solves was going to drop anyway as the easy cases were exhausted.

The situation before the change in GEDmatch was much the same as when the State of California first automated fingerprint identification. At first, there were a large number of fingerprint identifications made that were "waiting to happen". I refer to these as Oh My God (OMG) cases. But once the easy cases were exhausted, the number of IDs leveled at some steady rate, that is probably gradually increasing due to the submission of new cases that is causing the database to gradually increase in size.

The change in GEDmatch has disrupted this process, but as GEDmatch's size gradually increases, the number of solves will eventually reach the steady state it would have had had there been no disruption. But the OMG era is probably over.

Is there an upside to the GEDmatch change? For example, does this alleviate privacy concerns?

Yes there is a positive side. The genealogical and the law enforcement communities have long been suspicious of each other. The use of GEDmatch allows us to collaborate and each appreciate the value of the other. The change in the terms of service is a part of the negotiation of our working relationship. As GEDmatch allowed the upload of a wider range of case types in favor of LE, the concession to the genealogists was the opt-out default to allow them the choice to keep their data private. I am hoping that this relationship continues to develop, although I believe there will be more adjustments along the way.

Should a reduction in the number of profiles available for searches discourage labs that might be considering implementation of investigative genealogy techniques?

I assume by "labs that might be considering implementing investigative genealogy techniques" refers to labs that produce a GEDmatch kit and then have genealogists on staff to upload the data to GEDmatch for analysis. No I don't think labs should be discouraged from offering the service. This is only a temporary setback. The number of profiles will increase over time, and you never know when that top match will appear that will solve a case.

What advice would you give to individuals with profiles in GEDmatch who are weighing whether or not to opt to searches by law enforcement?

To make a decision based on careful consideration of the benefits and disadvantages of opting in or not opting in. Don't make the decision based on emotion.

Are there other databases that law enforcement is using for genealogical searches? Are they comparable to GEDmatch?

Family Tree DNA has the only other one I am aware of of any size. I understand it is larger than GEDmatch, but I don't know for sure. I also understand there are technical issues with the uploads to FTDNA for files from other companies, but I only have second hand information on that. My own files have been uploaded without any problems. Some of the files with technical issues were probably created using microarray (chip) technology that is not suitable for highly degraded samples. The absence of SNPs because of sample degradation probably causes reduced overlap between FTDNA's SNP set and and SNP data from an external upload.

A number of service/specialty labs are now offering a genetic genealogical service. Is this a technique that can realistically be brought in house to most forensic labs? What would be the benefit of outsourcing vs. doing the work in house?

You have to define what you mean by genetic genealogical service. There are two parts to this: the service lab generates the data and the genetic genealogy analysis that uses that data to identify suspects or John/Jane Does.

As far as the bringing microarray or whole genome sequencing to forensically certified labs to generate the SNP data required by GEDmatch, in the long run, yes there is a benefit for producing the data in-house as it keeps it in the forensic community. This will require long-term cross validation and standardization efforts, as per SWGDAM recommendations.

However, this can't happen in the short term because forensically certified labs are not equipped to produce this kind of data, they have no trained personnel, nor the workflow, nor the policy and procedures. There has been no cross validation studies, nor standardizations. SWGDAM is only now starting to organize its thoughts on genetic genealogy. So at the moment, data generation must be done by external service centers and specialty labs.

This situation arose because this kind of genetic genealogy analysis (using autosomal SNP data) came out of the biomedical industry, not out of the forensic research community. So the forensic labs have got to have time to catch up.

As far as the genealogical work, without the ability to create SNP data on forensic cases, there's no point in having genealogists in-house at forensically certified labs. Those labs have to outsource the data to service centers and specialty labs, so why have the genealogists on staff? Why not outsource both?



Allison Nunes

DNA Labs International

GEDmatch has recently changed all uploaded profiles in their database to a default opt out for searches by law enforcement. How do you see this impacting the number of cases solved using genetic genealogy in the future?

This is impacting our immediate cases. However, we've seen an influx of people uploading to public databases like GEDmatch since the Golden State Killer, which demonstrates the general public is actively interested in helping law enforcement. This leads me to believe that within time a vast majority of users will choose to opt-in for law enforcement searches. #opt-in

Is there an upside to the GEDmatch change? For example, does this alleviate privacy concerns?

I do think there is an upside to ethical and privacy concerns, and this policy provides more transparency for the general public. Logistically there is a huge benefit to GEDmatch because it also eliminates the potential for individuals filing to have their profiles removed on a one-by-one basis. Enacting this policy change now, gets rid of a potential issue early on in the process which should make for a smoother future for forensic genealogy.

Should a reduction in the number of profiles available for searches discourage labs that might be considering implementation of investigative genealogy techniques?

Implementing investigative genealogy on a lab by lab basis is not as simple as it sounds. Laboratories that are considering investigative genealogy should first assess how many cases it could potentially benefit, and from there determine the best way to meet those needs, whether it be complete outsourcing or outsourcing of just the single nucleotide polymorphism (SNP), whole genome sequencing (WGS) or Y-STR testing.

What advice would you give to individuals with profiles in GEDmatch who are weighing whether or not to opt to searches by law enforcement?

I would ask them to consider what their hesitations truly are and if they can alleviate those hesitations with more information. There is a vast amount of information available online as well as on the public database websites regarding what these law enforcement searches entail. If you are a serial killer you may think twice about opting in as well!

Are there other databases that law enforcement is using for genealogical searches? Are they comparable to GEDmatch?

Yes, Family Tree DNA maintains a large database that allows for law enforcement searches for violent crimes.

A number of service/specialty labs are now offering a genetic genealogical service. Is this a technique that can realistically be brought in house to most forensic labs? What would be the benefit of outsourcing vs. doing the work in house?

Forensic genealogy should be a tool that is enlisted after other options are exhausted; i.e. CODIS searches, familial CODIS searches, etc. It is a very time consuming process. Typically laboratories are only considering this tool for violent crimes like homicides and sexual assaults. A laboratory should take a long look at the amount of cases that would benefit by forensic genealogy testing and weigh the cost of outsourcing those cases against the cost of implementing a forensic genealogy investigative team.

Nicole Siffling

Meeting and Marketing Communication Manager



Tell us a little about yourself.

My name is Nicole and I have worked for Promega for 19 years! As I work as a Meeting and Marketing Communications Manager in the EMEA area, I know a lot of customers from that area and speak various languages. My role at ISHI is to be the contact point for all International attendees, when they have questions, need help or simply want to chat with me.

What do you do for fun? What are your hobbies?

I love nice things and good drinks and food! My favorite activity is to spend time with my family and friends with a nice glass of wine or champagne and cook! To compensate the calories, I go to the gym, which is not always fun, but afterwards, I do feel better!!

Do you have any favorite ISHI memories?

My absolute favorite memory was the aquarium in Atlanta!! I used to dive a lot all over the world and the world underneath the waterline is still so fascinating for me. The two sleeping Belugas swimming in circles with one eye open, one eye closed looked so beautifully!

Do you have any tips for first time attendees?

Don’t be intimidated by all these people!!! They are all very friendly! Take it easy and plan time for stopping by at the posters, the booths and enjoy listening to those interesting talks!

And if you have any questions, ask them and approach the speakers – also at the welcome reception or the social event! This is YOUR chance to network and learn!

What's one thing that would surprise us about you?

Maybe that I have been tapdancing for over 30 years…? Or that I have over 30 different Gins at home and guarantee to mix you your favorite gin and tonic…? Or that I am a member of the Inner Wheel Club in Mannheim and support children's and women's projects…?

Ann MacPhetridge

Senior Global Commercialization Marketing Manager



Tell us a little about yourself.

I'm a mom to a son who's going off to college in the fall (I have mixed feelings on that) and have been married for 23 years to my husband, Ken.

I've been with Promega since 2006 and had the good fortune to join the Genetic Identity business area in 2011 as a commercialization manager.

I lead the awesome ISHI team and have been doing so for about 6 years now. In addition to okaying the budget, my main role is to try to stay out of their way as they plan and implement their ideas for another information packed week. My other involvement comes in working with our terrific designers and folks on the ISHI team to plan a fun and unique booth each year for the meeting.

What do you do for fun? What are your hobbies?

I have a Golden Retriever, named Vincent, who keeps me busy with walks and trips to the dog park. When I'm not hanging out with him, I love to read and knit. My favorite outdoor activity is bicycling, which I took up when the orthopedic doctor suggested I give up running to save my knees.

Do you have any favorite ISHI memories?

I was very lucky to be assigned to interview retired FBI criminal profiler and forensic scientist, Dr. Peter Smerick, at my first ISHI. He was a great storyteller and I was riveted listening to him describe how his work helped bring to justice, one of the worst US serial rapists, James Mitchell DeBardelben. For a girl who grew up reading thrillers and murder mysteries, it was a dream come true.

Do you have any tips for first time attendees?

Don't be afraid to introduce yourself and network. Ask lots of questions! Stop by the booths of our exhibitors and learn what's new and how it can help you in your work (plus they have fun swag to take home).

What's one thing that would surprise us about you?

I've owned 11 new cars since I graduated from college in 1990. Apparently I have a "thing" for car payments.

Julia Langbehn

Meeting and Marketing Communication Manager



Tell us a little about yourself.

I have been involved with ISHI for 13 years. Throughout those years, I've had my hands in many tasks that help support pulling the program together. I am a key contributor when it comes to venue and site selections, as well as navigating the logistics. We travel to a handful of cities to select the best options that work within our budget and parameters.

I also partake in the yearly planning and go onsite to review meeting details 1 year prior to the next years' meeting.

The rest of the year, I contribute to the logistic planning, exhibit management, and our Promega booth.

You will find me working the Registration/Info Desk and when I'm not there, I am acting as Carol's backup wherever I am needed.

What do you do for fun? What are your hobbies?

When I am not driving kids around to and from dance, softball, soccer, t-ball and the many other fun extra-curricular activities we're crazy for signing them all up for, I like to shop…yes, my name is Julia and I'm a shopaholic. I like to re-decorate things and find things to re-organize. After all that, I enjoy gardening, kayaking and spending time with family and friends outdoors.

Do you have any favorite ISHI memories?

This is my 13th year assisting with and attending ISHI. Being on the planning team, we arrive early to set up and we stay late to close/end the show. During these non-show times, we laugh and have fun as a group making memories each year. There are so many behind the scene stories that a typical attendee would never know. We try to run things as seamless as possible even though it's inevitable that something "will" go wrong.

A favorite memory was one year when General Session was empty since it was the end of the day and most attendees were in the exhibit hall, Jerry from our beloved AV crew cranked up AC/DC Thunderstruck…let's just say I reverted to my high school cheerleading days and performed a pom dance I did 20 years ago.

Do you have any tips for first time attendees?

Read the signage and your program. It contains a lot of information so you know what is what and where to go. After that, have fun, enjoy the talks and meet new people.

What's one thing that would surprise us about you?

I'm not even 5ft tall, I just round up on my drivers license and I often wear heels.

On a 6th degrees of separation reference…My distant relative invented the Master Lock.

Carol Bingham

Symposium Manager



Tell us a little about yourself.

I started at Promega in 1991, so I've been here 28 years. I've worked on the International Symposium on Human Identification beginning with the 7th conference in 1996. A lot has changed since the early days of ISHI. I remember receiving most conference registrations by snail mail accompanied by checks. We tracked the registrations and payments in an Excel spreadsheet and mailed the confirmations back.
It wasn't uncommon for speakers to give their presentations using 35mm slides. I remember one or two speakers asking for an overhead projector, transparency and marker to use in their presentations. Naturally, we didn't have internet at the conference venues in the early days. Checking attendees in was a very manual process that including checking off names on a spreadsheet.

In my early days at Promega I used a typewriter for a lot of my correspondence, yikes! Learning Word Perfect was something that I never really mastered. After the meeting, speakers sent in their manuscripts on floppy disks and we compiled the materials into written Proceedings. Invariably we found a mistake once printing was complete.

Now I'm responsible for the overall execution of ISHI. I book the conference venues, source the giveaways like bags and t-shirts and of course order the food. In addition, I oversee the abstract review process, invite speakers and coordinate with workshop chairs to ensure that all details are in place. Essentially, running ISHI is a lot like planning a big wedding year after year.

While at the symposium you'll see me checking to make workshops are running smoothly, assisting speakers in the general session room and working with conference center staff as issues arise. After ISHI I coordinate the on-line Proceedings and make sure that all the invoices get paid. I'm always on the look out for ways to improve ISHI, so feel free to reach out with ideas for making ISHI more valuable to attendees.

What do you do for fun? What are your hobbies?

I'm a bit of a domestic goddess. I spend a lot of time in my kitchen, mostly baking. Since I'm on a perennial diet I tend to bring the treats into the office or send them home with my kids. My husband and I share the cooking duties, but he is arguably the better cook. We own every fancy kitchen gadget known to man including a sous vide and Ankarsrum mixer (probably the only one in Madison).

I have an extensive garden that I've cultivated in the nearly 20 years that I've lived at my house. In the late winter and early spring, I spend a lot of time contemplating garden plans and comparing the relative merits of various plants. Every couple of years I attempt to start seedlings which never seems to really pan out. This year the rabbits snacked on my baby plants. During the summer I spend a lot of time weeding, planting and dividing perennials. Ironically, I don't have any spring bulbs because I seem to run out of energy by the fall when it would be time to plant them.

To keep active, I visit the yoga studio located at Promega. For the past several years I've been taking classes a few times a week. My favorite is yoga nidra, which I've nicknamed "sleepy time yoga". I have noticed an improvement in my mood and balance as a result of my practice, but I doubt that I will ever master "crow pose".

Do you have any favorite ISHI memories?

The evening events at ISHI are always my favorite time. It's so nice to see attendees having a good time and relaxing after a full day of talks. The Museum of Flight in Seattle was one of my favorite venues. The atmosphere was almost magical under the suspended aircraft and wandering through the wing featuring old planes and stories from WWI and WWII was very inspiring. The singing quartet dressed in period uniform belting songs from the 40s added to the ambience.

The most touching moment I remember from ISHI was during our symposium in Minneapolis. Julie Weil from the "Not Just Me Foundation" recounted how she was brutally assaulted by a serial sexual predator in the presence of her young children. The attacker had been careful not to leave any physical evidence going to the extreme of shaving all his body hair. Were it not for a resourceful and tenacious DNA analyst, the tiny residual DNA sample would not have been found and the rapist could have evaded the police again.

At the end of panel discussion Q&A, the moderator, read aloud a question received through the conference app "Did you know your analyst is here today? Her name is Lisbeth Colon." Julie was as surprised as the rest of the audience. It was a truly emotional moment when the two women embraced and shed tears. It was also a great reminder of the real impact that forensic science has for victims of violent crime.

Do you have any tips for first time attendees?

My packing advice would be to bring several pairs of comfortable shoes as the days are long and involve a fair amount of walking between hotel rooms and conference rooms. In addition, I recommend bringing a sweater or wrap even if it's really warm outside. Conference rooms are often cold and its difficult to regulate the temperature.

Bring business cards and a willingness to go outside of your comfort zone to meet new people. ISHI is a great place to network with your fellow forensic scientists. The atmosphere is very friendly, and people are happy to share their advice and experiences. If you are looking for a new career, ISHI is a good place to scope out potential employers. Check out the message board for job postings and other notices of interest.

Make sure to download the conference app. An email with instructions for downloading the app will be sent to pre-registered attendees about a week before the conference. The app will show you where everything is located and what the agenda is for each day. You can follow along with presentations by downloading the slides and easily ask questions of the speakers via the app without having to step up to the microphone.

What's one thing that would surprise us about you?

I have an abiding fascination with the Black Death, or plague. Everything about that period is interesting to me. Although I wouldn't want to be transported back in time to experience what daily life was like, I'm really intrigued with understanding how the plague changed society and upended the social order. Some of my favorite novels are set in this period including: Year of Wonders by Geraldine Brooks and Company of Liars by Karen Maitland.

My travel has afforded opportunities to learn more about places affected by the plague. One of my favorite museums is the Medieval Museum in Stockholm. It's tricky to find as its tucked away under the Norrbro bridge. Inside you'll find displays describing what life was like in Stockholm from the 1250s to 1520s.

The last time I visited London I went on a plague themed walking tour. We met the tour guide outside of the Tower tube station. He was easily recognized by the rat (faux) that he carried on his walking stick. At the end of the tour we were met by a plague doctor who was dressed in a full leather coat with the characteristic beaked mask covering his head. It was really interesting to see modern London and learn about the plague pits buried under fancy buildings and hear stories about the plague from the perspective of ordinary Londoners.

Tara Luther

Marketing Specialist



Tell us a little about yourself.

I've been a member of the ISHI staff since 2013, so this will be my 7th meeting. Throughout the years, I've been involved in many aspects of the symposium, and some of you may recognize my name from email communication that we've had.

In the months leading up to the meeting, my main focus is on keeping the ISHI website and social media current, as well as preparing articles for the ISHI blog. I also enjoy working with exhibitors and attendees once registration is open.

During ISHI, it's not uncommon to see me floating around from place to place. I assist with checking in attendees and exhibitors at the registration desk, work with our video crew to make sure they have everything they need, check-in with exhibitors and our A/V crew during set-up, post on social media, and help out in any other ways I can. I definitely get my steps in that week!

What do you do for fun? What are your hobbies?

My husband would say that my favorite hobbies are shopping and creating projects for him to do around the house, but while I can get lost in Target for hours, I also enjoy photography and reading. One of my favorite things to do is grab a book and hop in our pool when the weather is nice. This summer, I'm looking forward to doing more hiking and kayaking as well.

Do you have any favorite ISHI memories?

So many! My first meeting was ISHI 23 in Atlanta, and that really set the tone for me in many ways, with the off-site event at the Georgia Aquarium sealing the deal. I remember walking into the ballroom with beluga whales peering at us on one wall and the whale sharks on the other, and thinking that if this is what ISHI entailed, then sign me up!

Since that first symposium, there have been many laughs with colleagues over dinner, and I love seeing the attendees and exhibitors come back year after year. It's always fun for me to see their reactions to things that we've been planning for months.

We've been really lucky to work with the same A/V Crew, videographers, and PR team throughout the years, and ISHI is one of a few times when we get to see them each year. It's almost feels like a family reunion during ISHI, and it's hard to say goodbye to everyone at the end of the week.

Do you have any tips for first time attendees?

It's been said before, but my biggest recommendation would be to bring comfortable footwear. I've been trying to find the perfect "ISHI shoe" for seven years, and each year I get a little closer, but I've found that bringing a variety of flats usually does the trick. We women really like to go for a certain look and tailor our shoes to the outfit, but I'd recommend saving the heels for dinner at night rather than limping through the convention center. Trust me, it's not worth it!

There is so much to see and do, and it can be overwhelming! I'd say focus on three topics that you'd like to learn more about and let that drive what you do for the week. Our focused topic lunch tables allow you to network and chat about a specific topic in depth. The poster sessions offer a depth of information and make it easy to ask questions to the presenters one on one. Most of the speakers stay for the entire week, so if you're feeling a little anxious about talking with them, try chatting over a cocktail on Thursday night.

What's one thing that would surprise us about you?

I've been skydiving twice (my parents only know about one), and even did one freefall through a cloud, which was an incredible experience. Before you give me too much credit, I also had a panic attack in the shallow end of a swimming pool learning to scuba dive. I guess you win some and you lose some! Thankfully, I was able to push through it and explore the Cayman Islands from 60' underwater.

Sharon Zelanka

Executive Administrator



Tell us a little about yourself.

I have been working for Promega for 2.5 years now and the symposium in Palm Springs, California will be the third time I have attended ISHI. I am excited to be a part of the 30th Anniversary Celebration!

I assist at the Registration/Information Desk during ISHI with answering general questions, processing payments, helping check attendees into the conference/workshops and otherwise manning the station so my colleagues can tend to other matters at Promega's booth, workshops or general assembly talks.

What do you do for fun? What are your hobbies?

I always say, I'll try anything once! I've tried skydiving, bungee jumping and most recently tried stand-up paddle boarding, kayaking and canoeing (can't believe I've waited all these years to try those fun activities!) I enjoy exploring various Wisconsin's State Parks with friends and hiking the trails – it's not uncommon for us to trek 10+ miles on any given visit. I also enjoy biking riding on my commuter and road bicycles. Madison, WI has a wealth of commuter and bike paths and I've not even cracked the surface of riding on many of them!

Do you have any favorite ISHI memories?

In my short time with ISHI, I don't yet have a favorite memory that sticks out but loved the venue Promega offered during my first ISHI in Seattle, Washington at The Museum of Flight. That was a very cool experience to have the venue devoted only to ISHI attendees with aircrafts and artifacts suspended above and all around us.

Do you have any tips for first time attendees?

I would recommend first time attendees look through their welcome bag upon registration as it contains a lot of useful and helpful conference information ranging from everything you need to know about the conference to a coupon for a free t-shirt! I'd recommend comfortable shoes along with layering your clothing!!! Sometimes at conference venues, ISHI's general assembly, exhibit hall and workshop meeting rooms can be spread out … we usually do a lot of walking in a short few days of the event and sometimes in the warmer-weather locations, the rooms tend to run on the cooler side!

What's one thing that would surprise us about you?

I am a fan of heavy metal music – the louder and more obnoxious, the better!