

THE IDENTIFIER



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LETTER FROM THE PRESIDENT

I can't believe fall is already upon us! I had the pleasure of attending the IAI in Maryland last month and was able to meet some amazing people in the field of forensics. A few showed interest in speaking at our spring conference; so stay tuned for an exciting line up this year! The officers and board members have been working behind the scenes to make this year the best year yet for our division. If anyone is interested in speaking this spring, or has any recommendations, please reach out to me for a speaker registration form.

Some notes from the division meeting:

- IAI Editor spoke at length, requested that divisions send copies of their newsletters to the Editor (they may pull info to share to the main parent body)
- Can also provide basic conference information and group photos
- Requested we send a division logo to identnews@gmail.com (Luke completed)
- Currently 38 divisions with approximately 6000 members
- Division Committee
- Trying to attend more division conferences
- Limited funding from IAI
- President can provide video introductions if not attending conference in person.
- Funding available for divisions that need it
- Sourced from 5k fundraising events
- Must apply and show financial need
- Divisions set for suspension due to no contact
 - Bahamas, Dakotas, Japan, Trinidad/Tobago, Russia
- Vendor Discussions
 - Discussed people's feelings on supplying vendors with member information from a conference
 - Beneficial to the vendor of course
 - It was suggested to provide an "opt out" box upon sign up for the conference- then share info of people who did not opt out
 - Must allow the vendor to see value in coming to the conference
 - Suggestion to open the vendor breaks at your conferences to the public-allow anyone to attend that portion to bring in more foot traffic for the vendors.



Stay Safe,

Jodi Hunt, IAI President

INTERVIEW WITH AN OFFICER

Getting To Know Your 2023-2024 Elected Officers

During each issue of *The Identifier*, we will take time to introduce some of the newly elected SCIAI officers. For this issue, we interviewed the SCIAI's new vice president Nova Grilli, who shared with us her work experience, improvements within the forensic community, what she would like to pass on, what her hobbies are, and who has had major impacts on her career.



Tell us about your work experience. How long have you been a practitioner in the field and what is your current position? I started as a Tenprint Examiner for the Colorado Bureau of Investigations in 2007. In 2009, I started as a Biometric Examiner for Ideal Innovations and later promoted as a Latent Print Examiner in 2011. I became certified through the IAI in 2014. I did not have any job prospects when my family moved to Charleston in 2015. I had a crazy notion I would be okay if I did not go back into the field of latent prints. I quickly realized how wrong I was. I was fortunate to apply for my current job that same year. In 2016, I started as the Friction Ridge Manager for Charleston PD and currently continue to manage the unit. In addition to my responsibilities as the Friction Ridge Manager, I successfully completed training within the Digital Unit to analyze and extract cell phones in 2021. I have been a previous officer with the SCIAI and I am in my second term with the OSAC Friction Ridge subcommittee.

What improvements would you like to see in the forensic community? I would love to see adequate training in the field of forensics. Too many times examiners and technicians are thrown into a position without proper understanding of the fundamentals of their particular fields. In my opinion, this only harms the forensic community as a whole and we need to be aware and accept this is an issue in order to improve.

What is something you have learned in your work experience that you can pass along to others? Specifically, in the field of latent prints I would tell others not to let anyone persuade them into a decision you are not comfortable with. We have a duty to report the information that is present in fingerprints, we are not here to appease or agree with anyone. In addition, it's important to document your process and to be transparent, so you can always provide evidence for your decisions.

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INTERVIEW WITH AN OFFICER (Continued)

What are you passionate about or what hobbies do you enjoy? I am passionate about my family, their hobbies and horror movies. I have three boys, each have their own personalities and interests. Our 19 year old is off to college and I am excited to see what the future holds for him. Our eight year old is into piano and obsessed with anything police related, so I am constantly being shot with nerf darts and ordered around. Our six year old recently achieved his black belt in Taekwondo. When I'm not hanging out with my family, I love watching horror movies. I've found foreign horror films, especially Korean movies are great. As much as I love horror movies, it is understandable that I'm very passionate about Halloween too! Unfortunately, I'm the only one in my house that feels that way.

Who or what has had a major impact on your career? Multiple influential people have impacted my career. Since I began in this field, I had set goals for myself. Accomplishing these goals is easier knowing I have support from friends and colleagues in this field. I would encourage others to reach out to influential individuals in their field, no matter how intimidating it may be.

SCIAI ANNOUNCEMENTS

- **ALL MEMBERS** are encouraged to review the SCIAI constitution and by-laws posted on the website located under the News tab.
- Submissions for case study features and Member Spotlights are open. We want to highlight our members and interesting or unique cases that you have personally been involved with. If you would like to see yourself, a coworker, or one of your cases featured, please contact the Editor at bribrown@greenvillecounty.org
- Have a topic you would like to see covered or have an article you would like to submit for future issues of *The Identifier*? Submit your proposals to the Editor at bribrown@greenvillecounty.org — guest authors are welcome!
- If you've taken a newsletter appropriate forensic related photograph that you would like to see featured in an upcoming issue of *The Identifier* — Please contact the Editor at bribrown@greenvillecounty.org!

Latent Print Workshop

October 24th ,2023

Nova Grilli and Trish Odom

4700 Broad River Rd, Columbia, SC

[Register Here](#)

FREE FOR FIRST 30 REGISTERED MEMBERS



SCIAI TRAINING

SCIAI TRAINING

Bloodstain Pattern Analysis Recognition

November 9th, 2023

Douglas Young—Triad Forensics

4700 Broad River Rd, Columbia, SC

[Register Here](#)

FREE FOR FIRST 30 REGISTERED MEMBERS

****Stay tuned for more information**

IN THE NEWS

Published: December 2022

A customized protocol to generate STR profiles from latent fingerprints

Abstract

For decades, dactyloscopic and DNA analyses have both played a key role in forensic investigations involving friction skin patterns and/or human biological material. In many occasions, friction ridge impressions may hold little discriminatory power due to low quality of ridge patterns and/or insufficient area extension of such patterns. In these cases, an appropriate human DNA collection and a high-quality DNA extraction become crucial steps to yield a genetic identity from an unsuitable latent fingerprint pattern. Indeed, over the past few years, it has been proven that complete Short Tandem Repeat (STR) profiles can be obtained from a touch DNA sample. In this study, a protocol has been customized to maximize the performance of genetic profiling from latent fingerprints. Six participants provided two sets of finger impressions on pre-cleaned glass surfaces. These impressions were generated by the participant's dominant (DH) and non-dominant hand (NDH). Genetic material from fingerprints was pooled using a cotton swab for each donor and hand, combining 1–5 depositions consecutively. This was followed by DNA extraction, Real-Time PCR for DNA quantification, capillary electrophoresis (CE) for sequencing, and genotyping software for STR profiling. DNA yield was measured by ng/cm^2 (DNA/fingerprint area). Statistical tests detected DNA yield differences by donor's sex, age distribution, handedness and fingerprint pooling. Results revealed that DNA quantities from DH was dependent on the number of pooled fingerprints. However, NDH yielded similar DNA quantities across all fingerprint pooled combinations. With the aid of a customized protocol, DNA titers was improved and meaningful STR profiles were produced for donors' DH and NDH.

Introduction

Friction skin ridge patterns are considered one of the most relevant physical evidence, with donor identification potential, that can be recovered from crime scenes. Indeed, for a century, fingerprints have been examined to exclude or individualize a suspect in crime-related investigations. Friction skin may not only provide a unique ridge pattern through the location, orientation, and type of minutiae but also contain biological material; both items useful for identification purposes. Often, crime investigators must choose between enhancing a latent fingerprint or extracting its DNA [1]. In many occasions, fingerprint patterns may not be valuable as evidence because of insufficient quality of ridge patterns. These situations make DNA analysis the only alternative for donor identification.

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IN THE NEWS

A customized protocol to generate STR profiles from latent fingerprints

Generally, surfaces where fingerprints are collected are classified into two main classes: porous and non-porous. Those deposited onto porous surfaces are absorbed into the substrate and tend to be more durable and resilient to external insults [2]. Non-porous surfaces are non-absorbent, making fingerprints more susceptible to damage as the residue existing on the outermost surface is more exposed to environmental and mechanical influences [3]. The main objective was to develop a protocol for human DNA collection and a high-quality extraction to produce a meaningful genetic identity from an unsuitable fingerprint pattern considering biological sex, age of the donor, handedness, and fingerprint pooling.

Materials and Methods

Six volunteers (3 males and 3 females) of two age groups (20–40 and 50–70 years old) agreed to participate in the research by donating their fingermarks and their DNA. After signing and agreeing with the consent form, volunteers gently washed their hands for one minute with water and soap and allowed fingertips to naturally “recharge” for 10 min. A gentle finger tapping was applied to homogenize skin/sweat compounds at deposition. Each volunteer provided a total of 5 sets of samples in duplicate from each hand (dominant = DH and non-dominant = NDH) on a glass surface, previously sterilized. Latent fingerprints from DH and NDH were deposited and combined in the following fashion: DH 1 / NDH 1 = 1 fingerprint; DH 2 / NDH 2 = 2 fingerprints; DH 3 / NDH 3 = 3 fingerprints; DH 4 / NDH 4 = 4 fingerprints; and DH 5 / NDH 5 = 5 fingerprints, placed next to each other for pooling. Contrarily to the most modern technique of double flocked swabs [4], DNA was collected with 10 μ L dd water wet cotton swab per sample combination.

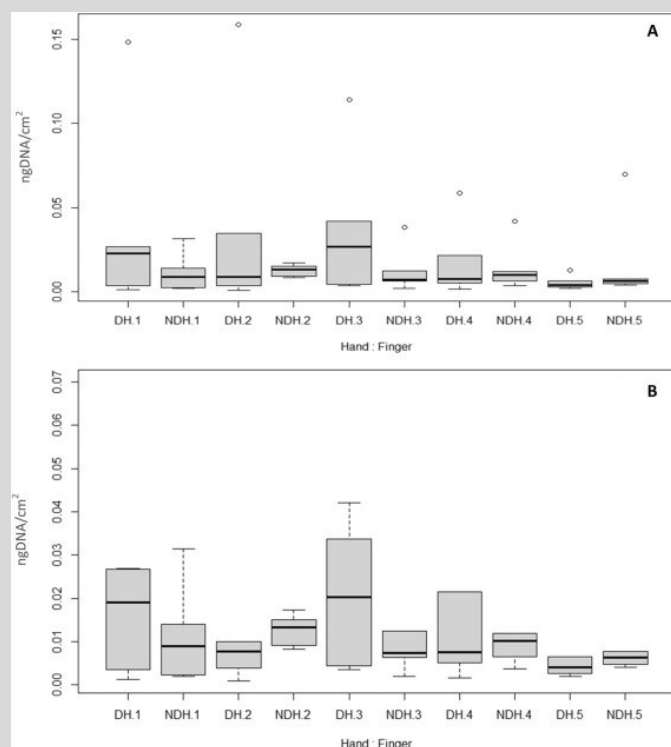


Fig 1. Human DNA obtained per deposition area. **A.** Boxplot representing DNA quantity (ng) obtained per fingerprint area (cm²) with outliers. **B.** Bar graph representing DNA (ng) obtained per fingerprint area (cm²) without outliers. DH and from DNH from six donors are shown. Each series represent the five cumulative swabbing process. Error bars represent the standard error. No statistically significant results were detected between hands ($p > 0.05$).

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IN THE NEWS

A customized protocol to generate STR profiles from latent fingerprints

DNA extraction from fingerprints, was performed with the Qiagen® QI-Aamp® DNA Mini Kit. DNA was quantified with the Human Quantifiler® kit using Applied Biosystems 7500 Real Time PCR System. DNA concentration values were normalized per fingerprint surface extension as ng/cm². Sample sets were amplified with AmpFLSTR™ Identifiler™ Plus PCR Amplification Kit on a 9700 GeneAmp PCR System, first by following the manufacturers protocols (Fig. 2A) [5] and after by increasing the number of denaturing, annealing and extending stage cycles (Fig. 2B). The customized protocol included: single wet swabbing for collection and 32 cycles for PCR amplification. Capillary electrophoresis and STRs analysis by GeneMapper ID 3.2 software (AppliedBiosystems) was performed.

Statistical analyses were performed (Student t-test and two-way ANOVA) with R studio software [6]. ANOVA was followed by Tukey HSD post hoc comparisons. In both cases, an alpha value of 0.5 was set as statistical significance.

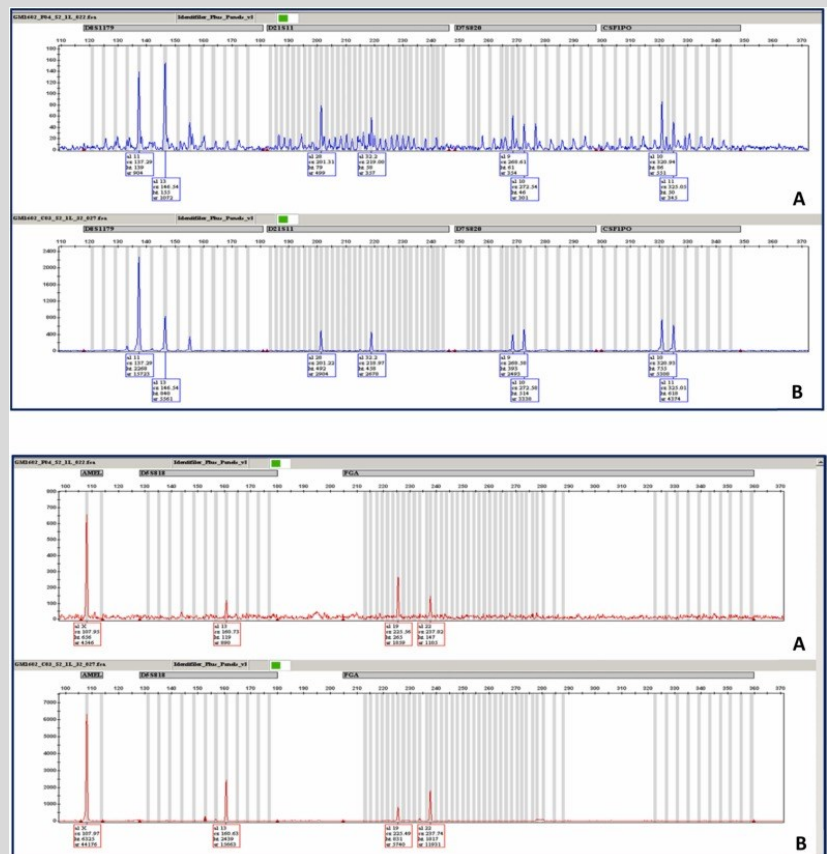


Fig. 2 Examples of electropherograms obtained from 0.002 ng/μL from NDH1 female donor. The sample was amplified by AmpFLSTR™ Identifiler™ Plus kit by manufacturer's protocol (A) and by our optimized customized protocol (B). STR profiles were improved in peaks' height and quality. Note: the artefact in D8S1179 locus.

Results and Discussion

Each of the two sets of fingerprints, DH and NDH (ng/cm²), contained samples from five cumulative swabbing processes: DH1 to DH5 and NDH1 to NDH5. Three of sixty depositions, belonging to two donors' DH, were detected as outliers by R-studio software [6]. These differed greatly in terms of DNA titer, possibly due to operator's contamination, and were removed from further statistical analyses (Fig. 1A). No differences in DNA titers were detected ($p > 0.55$) between sexes and age groups.

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IN THE NEWS

A customized protocol to generate STR profiles from latent fingerprints

For DH sets, regardless of biological sex and age, DNA recovery slightly increased up to three pooled depositions ($p > 0.5$) (from 0.015 ng/cm² to 0.021 ng/cm²); however, when combining four and five fingerprints, a decrease in DNA quantity (0.05 ng/cm²) (Fig. 1B) and STR quality (Fig. 2A/B) was noted ($p > 0.5$). For the NDH, the yield increased gradually across finger combinations but was not statistically significant (from 0.011 ng/cm² to 0.016 ng/cm²) ($p > 0.5$) (Fig. 1B). Interestingly, NDH 4 and NDH 5 increased DNA recovery unlike DH counterparts (Fig. 1B). The difference between DH and NDH, as well as the effect of fingerprint combinations (Fig. 1B), revealed no significant interactions between DH/NDH and DNA yields ($p > 0.5$) with no finger combination effects ($p > 0.5$). The average DNA quantity obtained across all DH and NDH fingerprint area was the same (Fig. 1B) (0.070 ng/cm² DH and 0.067 ng/cm² NDH).

It is possible that with DH, the swab became saturated with fingerprint compounds and failed to collect more cellular material from the third fingerprint combination onward. For NDH, there could be less starting cellular material and therefore the swab did not saturate for the samples analyzed.

Conclusions

The authors have described a customized protocol for quantifying and normalizing DNA titers per cm² of fingerprint surface. This novel approach may provide a minimum required fingerprint area extension to obtain useful STR profiles. No significant differences in DNA quantity were revealed between sex and age groups. DNA recovery was slightly improved up to three pooled fingerprints for DH and five for NDH, although not statistically significant. DH and NDH height peak electropherogram signals were enhanced with the modified protocol, producing STR profiles cleared of noise and artefacts.

Happy National Forensic Science Week

(September 17th-23rd, 2023)

This week recognizes the contribution that Forensic Science makes to the criminal justice system. It is an opportunity to celebrate academic programs, forensic professionals, and scientific research in the various forensic disciplines.

Thank you to all members of the SCIAI. Forensic Science in South Carolina would not be successful without you and your hard work that you do day to day in each of your agencies!



FUN With FORENSICS

In honor of National Forensic Science Week, this issue will feature forensic science related trivia

- 1. What year did National Forensic Science Week become official?**
- 2. What does the term “Livor Mortis” refer to?**
- 3. Who was responsible for the creation of the “Body Farm”?**
- 4. What is studied in forensic palynology?**
- 5. When and where was the first recorded application of forensic entomology?**
- 6. The 1911 case of the People vs Jennings was a landmark in forensics as it established the admissibility of which form of evidence uniquely identifying individuals in the United States?**
- 7. What is the name of the condition involving the body's temperature decreasing after someone dies?**
- 8. What is the name of the process that can cause a body to produce "grave wax"?**
- 9. What is the name given to the examination of fingerprints?**
- 10. Who is generally recognized as being the first person to use fingerprints as a means of identification?**
- 11. After death, the muscles of the body become stiff. What is this referred to?**



FUN With FORENSICS

Frequently in the field of Forensics, we, as a whole, deal with a variety of difficult and demanding scenes, tough scenarios, and are often placed in stressful situations. This panel is designed for you to have the opportunity take a quick mental break, refresh your mind, and also to have a little fun. 😊



Spot the Differences Key from Summer Issue

UPCOMING TRAINING/EVENTS

Sept 18th-21th, 2023: Forensic Supervisor Success Summit

Gap Science: FREE Virtual Event—online, [register here](#)

Sept 25th-27th, 2023: Medicolegal Infant Death Investigation

SC Sheriff's Association; FREE, 112 Westpark Blvd, Columbia, SC, [register here](#)

Oct 2nd-5th, 2023: [NCIAI, GAIAI, TNIAI Joint Conference](#)

Harrah's Cherokee Resort and Conference Center, Cherokee, NC

Oct 24th, 2023; Latent Print Workshop; [Register here](#)

FREE; 30 registered members; 4700 Broad River Rd, Columbia, SC

Nov 9th, 2023; Bloodstain Pattern Analysis Recognition; [Register here](#)

FREE; 30 registered members; 4700 Broad River Rd, Columbia, SC

[Online Training: Latent Print Examiner Training Experience](#)

On Demand, Self Paced Training; Delta Forensics; \$5000

If you have upcoming training that you would like advertised in the newsletter, contact the Editor with course information and details!

EMPLOYMENT OPPORTUNITIES

Greenville County: [Forensic Evidence Technician](#)

Greenville County: [Firearms Laboratory](#)

City of Charleston: [Associate Criminalist](#)

Fort Mill: [Forensic Investigator](#)



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