

Human identification

Making forensic DNA analysis more efficient and effective

How DNA Labs International is using innovative technologies to aid law enforcement

DNA Labs International (DLI) has successfully leveraged cutting-edge technologies—including the Applied Biosystems™ HID NIMBUS® Presto System, Applied Biosystems™ SeqStudio™ Flex Genetic Analyzer, and Applied Biosystems™ GeneMapper™ ID-X Software v1.7—to optimize workflow efficiency and increase productivity. By integrating these advanced technologies, DLI has also been able to expedite lab processing.

To discuss how they enhanced their workflow, we sat down with DLI president and laboratory director Allison Nunes, chief scientific officer Rachel Oefelein, technical leader Cristina Servidio, and QA laboratory processing specialist Brittany Stirmell. Read on to learn how DLI is integrating these innovative technologies into their forensic DNA casework and partnering with law enforcement to help solve crimes faster.

Thermo Fisher Scientific: Please tell us about your general workflow at DLI.

DLI team: First, let's start with our promise: we provide DNA service excellence through our commitment to help solve crimes with DNA. This commitment is the foundation for how we design and execute our forensic workflow. We pride ourselves on our quality of services and the efficiency with which we deliver them.

We employ a technician-based process. Instead of having one analyst take the case from start to finish, we have one individual who focuses on one part of the workflow for all the cases. For example, we'll have someone who's focused on quantitation for the day, and they might process 90 cases. Or, we'll have someone focused on amplification for that day. This process helps us operate in the most efficient way possible in order to be a very high-throughput lab.



Rachel Oefelein, Cristina Servidio, and Allison Nunes



Thermo Fisher: How do you decide what new technology and processes are needed in your lab?

DLI team: DLI prioritizes staying up-to-date with the latest forensic advancements. We continuously evaluate new technologies to determine how suitable they are for providing the services necessary to help close cases. After identifying a new technology to bring onboard, we then consider the timeline for implementation: will it be within the current year, or five years down the road?

We process a lot of different case types. Recently, we've received a lot of homicide cases that need to be processed with a requested turnaround time of 24 to 48 hours. We want to be able to process these law enforcement cases as quickly as possible and assist in getting violent offenders off the streets. Bringing on new technologies helps us handle all types of cases and deal with every type of crime.

In addition to homicides, property crimes and sexual assaults are high-volume cases. Much of the instrumentation that we're bringing online can address these high-volume case needs. Additionally, automating our liquid handling capabilities allows us to process more samples at once. We made a lot of changes in 2024. With the purchase of the HID NIMBUS Presto System and the SeqStudio Flex system, we're really "eyes forward" to efficiency and innovation.

Thermo Fisher: How has the HID NIMBUS Presto System helped DLI achieve its efficiency and quality goals?



DLI team: Automation is key to lab efficiency. Using the HID NIMBUS Presto System with the Applied Biosystems™ PrepFiler™ Forensic DNA Extraction Kit is very easy and has sped up our process. Our extraction time is cut almost in half compared to our previous liquid handler. This results in more hours for our analysts and technicians to be able to process additional cases. It also means we're able to get those cases out the door more quickly—and back to our clients so that they have the tools they need to continue their investigations.

The learning curve to use the system was very small. The scripts were included in the software. There wasn't much we had to do. We just followed the preprogrammed steps and we were ready to go. For us, it was plug and play. The validation was quite easy, as it was more of a material modification because we already run the PrepFiler kit chemistries. We just had to take that process and see if the HID NIMBUS Presto System could give us the same result, which it did. It only took us about two weeks. Now we're able to easily do two runs of the PrepFiler kit in a day if we'd like. This changed our output from 88 samples with controls to 176.

We offer a 24-hour turnaround time if someone needs it. That's how fast we can generate court-admissible results. Any tools we can add to increase efficiency minimize the impact of accepting these rush cases for processing.

The HID NIMBUS Presto System enables fast DNA purification, which significantly reduces our processing time. We're looking forward to implementing the quantification setup, normalization, and amplification setup capabilities, which will skyrocket the abilities of this instrument even further in our lab.

Thermo Fisher: How has the SeqStudio Flex Genetic Analyzer contributed to your lab efficiency requirements?



DLI team: When the SeqStudio Flex analyzer arrived at our lab, our first impression was how beautiful the instrument is. Our previous genetic analyzers would always come with a computer on the side. This system has it all integrated inside with an easy-to-use touchscreen and it's very modern-looking.

The SeqStudio Flex Genetic Analyzer can load four plates on the deck at the same time. This doubles our capacity, as previously we could only load two at a time. The system also has a function where you can pull out the drawer and load plates while the instrument is running. This is helpful because we can now add plates onto the same instrument at different points of the day. We can now continuously add plates into the queue. It's especially valuable when you have a rush situation, in which you have a case that needs to be processed immediately. You don't have to wait to load plates until that run is through—you can add plates to the instrument at any point.

The capillary array for the SeqStudio Flex analyzer is much sturdier than previous capillary arrays. Before, we were worried about bending or snapping the array because it was so fragile. Now it's faster to replace.

In addition, there's an auto-spectral calibration function, which is great because a lot of time is spent running spectrals and making sure they look nice and neat to produce the best-quality data. The auto-spectral function prevents us from having to repeat spectrals and adjust them repeatedly.

The SeqStudio Flex Genetic Analyzer is connected to our local area network. This is important because any analyst at our company—no matter what time of day—can connect and remote in to the actual instrument to look at their data. We are a private lab with analysts all around the US, and many aren't here on-site. This option provides great flexibility for those who need to keep analyzing data after business hours and if needed to load reinjections.

Thermo Fisher: Are there any specific features or updates in GeneMapper ID-X Software v1.7 that have received positive feedback from analysts in your lab?

DLI team: With the addition of the SeqStudio Flex analyzer, we're using GeneMapper ID-X Software v1.7. The software looks great. It's more user-friendly and has several great updates that we're very excited to start using.

- One of our favorite features is that we can have several projects open at the same time. Previously, we would have to open a project, analyze the data, and then close it in order to open another project. Now we can have them open at the same time, and open electropherograms from those projects to directly compare to each other.
- One of the top benefits that we see with the software is the ability to put notes on the actual electropherogram. Previously, we would have to print to PDF, then append notes to the actual PDF documents with any edits we wanted to do with the interpretations with several contributors. Now we can do that in the GeneMapper software and it automatically prints those notes directly on the electropherograms.
- The software now displays each dye channel and its analytical threshold. We have many kits online, so there's no way that our analysts can memorize all those thresholds, especially when you have a different one for each dye channel.
- One other cool thing is the autosave function. The motto "save early, save often" is a thing of the past. The autosave function makes it so we don't have to do that any longer. The software has been moved to the new database, which seems to make everything faster and more stable as well. This is very important, especially when we have big projects that we're analyzing. We don't want to lose connection with the database and lose the edits.

With GeneMapper ID-X Software v1.7, we have new tools at our disposal that will really help our analysts streamline their analysis and interpretation—and make the entire process a lot faster.

Reference profile
from
the references
project



Evidence
mixture
from one of the
opened evidence
projects

Thermo Fisher: How have these new tools affected your ability to best serve your clients?

DLI team: Efficiency in our lab is very important. This is how we can process so many samples every year and continue to grow. Efficiency is nothing without quality, because quality is essential in forensics. It can be the difference between successful case resolution, releasing an offender, or prosecuting the innocent. Bringing instruments into our lab that are high-quality and efficient is crucial.

For the future of DLI, we will continue to evolve and innovate. This means keeping our eyes on what's new in forensic technology. How can we operate the best? How can we be the most efficient and get the highest-quality results? By doing this, we can quickly bring answers to law enforcement and help keep our communities safe.

These new tools are going to help us smooth out the whole process and make sure we're producing timely and high-quality work with the best output that we can. First and foremost, you want quality followed by efficiency, and we can get both through innovation. From there, everything is golden.

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