

Pushing the Boundaries of Forensic Science

In the Forensic Biology Lab of the Harris County Medical Examiner's Office, a Ph.D. scientist conducts DNA analysis from saliva found on a half-eaten apple obtained from the scene of a recent burglary.

On another floor, a room of doctors, specialized in forensic pathology, along with fellows, residents, and medical students, re-view digital photographs and case files for up to 20 decedents (deceased persons) brought to the office during the night.

Across the building, Ph.D. scientists assist local law enforcement in determining the type and amount of illegal substance found in a DUI case.

And down the hall, a forensic anthropologist studies the bones of an unknown decedent to discover clues that will help in identifying and returning the body to family members.

It's all in a day's work for the Harris County Medical Examiner's Office, which provides forensic investigation and analysis to Harris and surrounding counties, plus 60 law enforcement agencies, through its forensic biology, pathology, anthropology, and crime laboratory services. The office is not only staffed by some of the nation's top Ph.D. scientists and medical doctors in forensic science, but has voluntarily achieved five accreditations, including a recent international accreditation in worldwide methodologies and protocols, awarded by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board.

Cont'd. from **T. C. Jester**, cover page

system and traffic signalization on T. C. Jester at FM 2920. Precinct 4 partnered with KB Home and Bridgestone Municipal Utility on this segment.

The two remaining segments, Segment A (north of Spears Road to FM 1960) and Segment C1 (Center Court Drive to Spring Cypress Road), are four-lane boulevard sections that will include storm-sewer systems and storm-water detention. Segment A is currently in the preliminary engineering phase, and Segment C1 is under construction with a scheduled completion of December 2009.

"In just five years, we have raised the standard of work such that all forensic services are now accredited," says Chief Medical Examiner Dr. Luis Sanchez. "Harris County residents can feel confident that we are not only meeting the rigorous standards set for the forensic community, but are working to go above and beyond."

Since Sanchez stepped into the role of chief medical examiner in 2003, the office has created standards of practice for every job function—from autopsies to DNA analysis to basic office functions and disaster preparedness—and has made it a priority to fill its staff with Ph.D. experts and doctors certified in specific forensic fields.

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"Thanks to Harris County's Commissioners Court, we now have the resources needed to do our jobs with greater efficiency. Our doctors publish and present to the medical community a great deal and we have gained a national reputation that now enables us to recruit the best in the field," says Deputy Chief Medical Examiner Dr. Dwayne Wolf. The office is a member of the Texas Medical Center, and Wolf appreciates the close ties to other medical experts. "The medical examiner's office is considered an academic institution and is now listed as an elective course for fourth-year medical students at UTMB," he says.

The Forensic Pathology Division's forensic investigators, which include nurse investigators, conduct approximately 15,000 inquests each year for sudden or unexpected deaths from a physical or chemical injury, any death



Kimberly A. Kerlec processes forensic samples at the medical examiner's DNA Laboratory. Photo courtesy of the Harris County Medical Examiner's Office

within 24 hours of checking into a hospital, any death that occurs at home in which the decedent has not been under the care of a physician, and any death of a child. Of those 15,000 reported cases, forensic pathologists conduct approximately 3,500 autopsies. "Our doctors obtain a level of detail—especially with autopsies of a child—that just isn't seen in other autopsy reports," Wolf says.

Putting the Power Back in the Hands of Law Enforcement

The office's Forensic Biology Lab is on the forefront of applying many advances in forensic science. "In the Biology/DNA Lab, we can create genetic profiles from just a couple hundred skin cells, but we are constantly pushing for smaller and smaller samples. New technologies give us the power to increase that level of sophistication," says Roger Kahn, Ph.D., who has been working in the field of forensic biology and DNA testing for over 20 years.

The Biology Lab has seen remarkable success working with law enforcement to solve property crimes. "We've helped train police officers to collect the samples we need from a crime scene. A partially eaten piece of food, blood, or skin cells left on a jewelry box can yield enough DNA to match a perpetrator to the scene of the crime," Kahn says.

Once a DNA profile is established,

See **Medical Examiner's Office**, page 5

Independence Park Home to New Live Oaks

When employees of the global technology and consulting firm Invensys Process Systems (IPS) bought tickets to this year's annual employee holiday party, they knew they were playing a part in creating something lasting for the community. Thanks to their donation to Trees for Houston (100 percent of ticket sales were donated), Precinct 4's Independence Park is now home to six newly planted live oak trees.

"IPS is committed to helping create a sustainable environment for our clients and communities, and we believe in walking the walk. This was a great opportunity to put this value into action," says Steve Blair, president of IPS North America. With the donation from IPS, Trees for Houston, a nonprofit which plants, protects, and promotes trees in



From left, Amanda Bruder, Rose Miller, and Carolina Yepes of Invensys Process Systems take part in the planting at Independence Park. Photo by Kaci Harvey

and around the Houston area, supplied the six trees for the park, as well as five trees for another planting at the IPS office in Webster, Texas. The nonprofit has planted 350,000 trees since forming after Hurricane Alicia in 1983. "Our mission is to plant trees that can be enjoyed by the community at large," says Ken Grubb, planting program manager at Trees for Houston.

The nonprofit worked with Precinct 4 Parks Department staff to select a good location for the trees and then guided about 20 volunteers from IPS in planting the trees. Trees for Houston will maintain the trees for two years, including weekly watering and replacement of any trees that die during the two-year period. "Precinct 4 was very helpful in making this happen," Grubb says.

"Thanks to the employees of IPS for their generous donation and to Trees for Houston for coordinating this effort. These trees will add to the park's landscape for years to come," says Commissioner Jerry Eversole.

For more information on Trees for Houston, visit www.treesforhouston.org.

Cont'd. from **Medical Examiner's Office**, page 4

the lab runs that profile through CODIS, a national DNA database of over six million people previously convicted of a felony. "Two-thirds of the time, we make a match. That's an absolutely astounding statistic," he says.

According to Kahn, studies show that when communities aggressively pursue DNA collection, the property crime rate actually goes down. "DNA testing puts the power back in the hands of law enforcement."

And more and more law enforcement agencies are making use of the lab. Just last year, the lab conducted approximately 1,500 DNA analyses for property crimes. This year, the lab is on track for up to 3,500 cases. "We have one of the most productive DNA labs in the nation because of the support we have from Harris County Commissioners Court. And we are on the forefront of implementing new technologies that are pushing the science to new levels," Kahn says.

The Crime Laboratory Services, directed by Ashraf Mozayani, Ph.D., includes controlled substances, forensic toxicology, and trace evidence labs. "The Controlled Substances Lab is one of our busiest labs. Our scientists see

9,000 cases a year," says Mozayani. "A new DART (Direct Analysis in Real Time) machine gives us the power to analyze and identify an unknown sample in seconds without preparing the

Scientists in the office's Controlled Substances Lab see 9,000 cases a year.

evidence in any special way, and the entire piece of evidence is preserved. In addition to identifying illegal substances, DART can be used to detect explosive material on clothing or even identify the type and origin of ink used on a document," offers Mozayani.

Another unique feature of the medical examiner's office is its Forensic Anthropology Division, which is one of only two in the nation. The division's staff of doctoral-level anthropologists and identification specialists work to identify unknown decedents (including conducting community outreach), assist in mapping and collecting crime scenes, and conduct bone analysis to

aid doctors and/or law enforcement. "The most rewarding part of my job is identifying the unidentified and providing closure for a family who may have been searching for a missing family member for years," says Forensic Anthropology Director Jennifer Love, Ph.D. Since the division was formed in 2006, the medical examiner's office has reduced the number of unknown decedents by an average of 10 to 12 a year to just three in 2008.

One of the most critical needs of the Harris County Medical Examiner's Office is appropriate space to conduct the forensic laboratory work. And thanks to \$80 million in bond funds approved by voters in November 2007, the medical examiner's office will soon expand its reach further into the Texas Medical Center with a new forensics center. "Forensic science is constantly changing and we are fortunate to have the support of Harris County residents and Commissioners Court to keep this office on the forefront of the industry and push science to new levels of sophistication," Sanchez concludes.