

Florida Tech installs revolutionary mass spectrometer

Florida Tech has become the first university with a doctoral, or research program, to own an instrument that is revolutionizing the work of old-fashioned mass spectrometers. The DART (Direct Analysis in Real Time) enables direct detection of drugs, chemicals or explosives on surfaces, in liquids and in gases without the need for sample preparation.

What used to take hours--analyzing paper money for cocaine, clothing for gunpowder, or urine for drugs, for example--can now happen on the spot. Florida Tech is one of only 15 installations of the JEOL USA Inc. DART, which just became available a year ago. Purchased for \$210,000, the instrument will be used in teaching, such as organic chemistry classes, and research. It also may assist community organizations such as law enforcement in their analysis tasks.

Recently seen on the TV show, CSI, the DART has won an R&D Magazine award as one of the 100 most technologically significant products introduced into the marketplace in 2005. It also won Pittcon Editors' Gold Award for Best New Product in 2005.

The DART allows sample analysis, by atmospheric pressure ionization, in the open air. It requires no radioactive components, solvent sprays or exposed high voltage to alter the sample state. The DART is currently in operation primarily in forensics and homeland security laboratories.

The highly-sensitive DART is one component of a three-part system. The DART sensor and a vacuum chamber sit atop the mass spectrometer, a JOEL AccuTOF, housed in a cabinet the size of a small photocopier. A computer, sitting beside the detection equipment, provides a read-out of the specimen's mass spectrum.

"If a dog can smell it, the DART can detect it too," said Dr. Robert "Chip" Cody, co-inventor of the DART system. Cody was on the Florida Tech campus recently to demonstrate the DART and train faculty.

Dr. Nasri Nesnas, Florida Tech assistant professor of chemistry, proposed the purchase of the DART system after a long correspondence with Cody.

Nesnas and another assistant professor of chemistry, Dr. Joel Olson, will be among the first to use the DART. They will apply it to their two-year-long nanotechnology project, to develop a molecular photosensor. The photosensor, based on compounds such as Vitamin A, found in mammalian retinae, is expected to be useful in the fabrication of miniscule cameras. The cameras could be the "eyes" of nanorobots used in medical, military and national security operations.

"The DART system is, by far, the most sensitive instrument that exists on this campus," said College of Science Dean Gordon L. Nelson. "We are very fortunate to have acquired this remarkably advanced instrument."

Source: Florida Institute of Technology

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