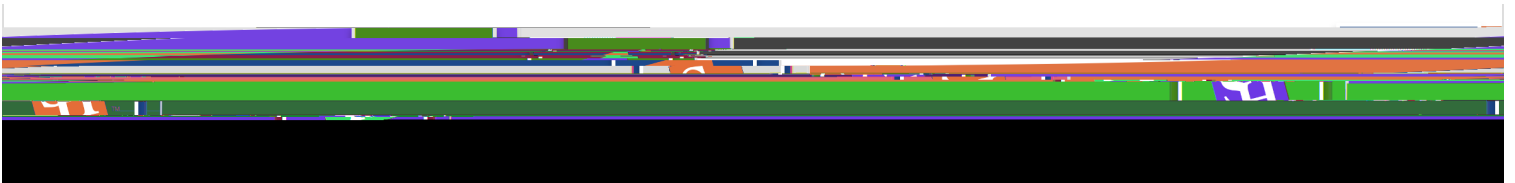


DEPARTMENT OF FORENSIC SCIENCE  
COLLEGE OF CRIMINAL JUSTICE

Capstone Research Topics  
Forensic Science

Sam Houston State University

24 June 2024





# Academic Year 2022-2023

' L I I H U H Q W L T H C A R I Q B B U S i n g A g L i g a n d I o n C o m p l e x a t i o n a n d E S I S / M S

The Detection and Quantitation of Ketamine in *Cochliomyia macellaria* (Fabricius) (Diptera: Calliphoridae) by GCMS

Probabilistic Tools for Improved Database Searching and Investigative Leads

Investigating the Capability of Micro-Raman Spectroscopy for the Analysis of Authentic Cannabis Samples

Differentiation of New and Used Transmission Fluids Using IR and ICPOES

Detection of Forensically Relevant Nitazenes Using Liquid Chromatography-Tandem Mass Spectrometry (LCMS/MS)

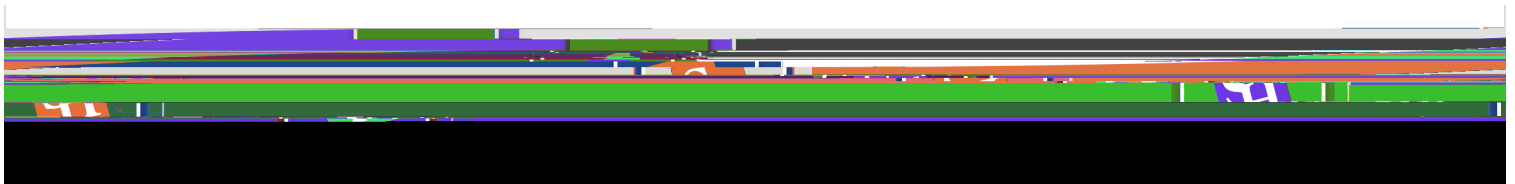
Assessment of Field-Portable Instrumentation for the Detection of Contact Explosives

Quantitative Color Analysis of Burned Bone to Predict DNA Quantity, Quality, and Genotyping Success

, Q Y H V W L J D W L R Q R I W H C H - A c e t a l e D E R O L V P R I " -

Investigating the Effect of Substitution Location on Fentanyl Analog Identification for Methyl Substituted Fentanyl Analogs Using GCMS

-AzMi+öÑaZ Ò0 S2 ( ofCa30030>-18 . [(A)-1m</MCID 23 >>BDCID 238J 18.03 0 Td ( )Tj 0.26 7S)



# Academic Year 2021-2022

Inter-laboratory Probabilistic Genotyping Parameters for Improved Forensic DNA Database Searching and Interpretation of DNA Mixtures

Optimized Recovery of DNA from Exhaled Breath Devices; from Drug Detection to Human Identification

Determination of Psilocybin, Psilocin, and Psilacetin in Plasma using MS/MS

Understanding the Transfer, Persistence, Prevalence, and Recovery of DNA in a Real Setting

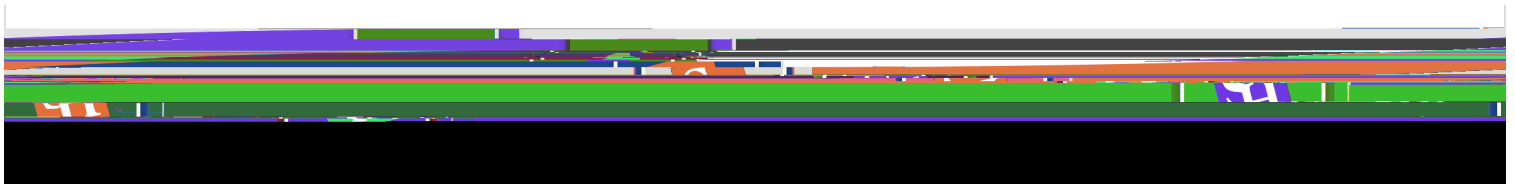
Development and Validation of a LC/MS Method for Detection of N, N-dimethyltryptamine and its Metabolites in Plasma

Quantitative Color Analysis of Burned Bone to Predict DNA Quantity, Quality, and Genotyping Success

Multifactorial Analysis of Soil Composition and DNA Typing from Buried Bones

The Efficiency of

cs(500.64 -1.15 -bn (s)-e0(s)-e0(s)-e0(s6>as)-e02 (t)-2 (i)-4 (t)w 3.36 0 TdThe E



# Academic Year 2020-2021

Development of SERS Evidence Swabs for Forensic Applications using a Silver Nanoparticle Biosynthesis

Comparison of DNA Extraction Techniques for the Recovery of Bovine DNA from Maggots

Optimization of Sperm Capture Method using Three Antibodies in Conjunction with Magnetic Beads

Characterization of Automotive Greases via Scanning Electron Microscopy Energy Dispersive X-Ray Spectroscopy (SEM-EDS)

Examining Partition Efficiency of Cell Types Following QIAcube/EZ1® Advanced XL Differential Extraction

Rapid Classification of Gasoline by Using a Handheld Raman Spectrometer

A More Effective, Automatable Differential Extraction Method for Processing Sexual Assault Samples

Differentiation of Synthetic Cathinone Isomers Using GC-MS and Multivariate Analysis

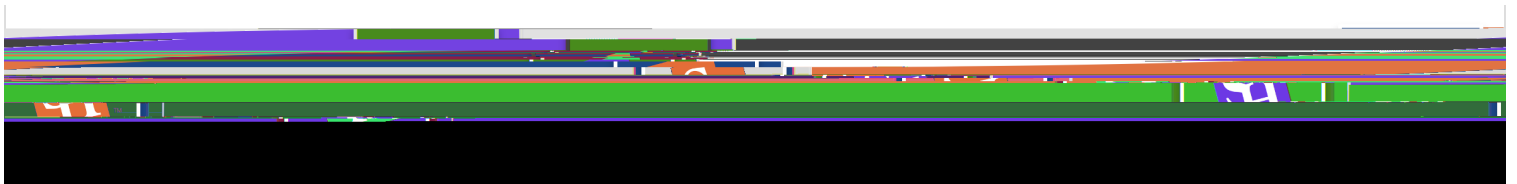
Visualization of Seminal Stains on Dark Textiles

Reevaluation of Reflective Index Dispersion Measurements to the Differentiation of Automotive Glass

The Sexome: Evaluating the Effectiveness of Microbial DNA Extraction Kits for Intimate Samples

Optimization of InnoXtract™ Extraction and Purification System for DNA Extraction from Skeletal Samples

Fentanyl Analogs in Dried Plasma Spots; A Novel Technique



# Academic Year 2019-2020

Development of a Five Dye Insertion/Deletion (INDEL) Panel for Ancestry Determination

Study of the Degradation of Artistic Varnishes due to Light Exposure by Pyrolysis Gas Chromatography/Mass Spectrometry (GC/MS) and Fourier Transform Infrared (FTIR) Spectroscopy

Differentiation of Hemp from Marijuana using a Qualitative Decision Point Assay

Evaluation of the trnKmatK-trnK, ycf3, and accD-psal Chloroplast Regions to Differentiate Crop Type and Biogeographical Origin of Cannabis sativa

Evaluation of Three Swab Types for the Collection of Touch DNA

Development of a Novel Fingerprint Interface for Trigger Pull Measurement

Detection of Five Fingerprint Residues on a Trigger Pull Measurement Device Using a Novel Interface

# Academic Year 2018-2019

Quantitative Identification of Mitragynine in Blood by Gas Chromatography-Mass Spectrometry

Data Fusion from Spectroscopic Techniques for the Discrimination of Colored Automotive Paint Mixtures

Comparison of Extraction Methods for Novel Synthetic Opioids in Blood

Fluorescent Components in Gunshot Residue

Quantification of Buprenorphine/Naloxone (Suboxone) in Breastmilk and Plasma

Quantitative Identification of Mitragynine in Urine using Gas Chromatography-Mass Spectrometry

Transmembrane Protein in Blood Clotting as an Indicator of Deep Neck Trauma

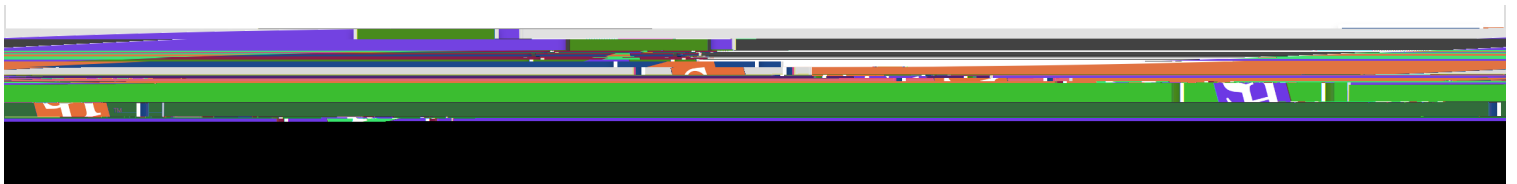
Glass Transfer and Persistence in Rubbed Shoes

Collection and Storage of DVI Samples with MicroFLOQ® Swabs for Direct Amplification

Human DNA Analysis of Crop Contents from Fly Larvae on Decomposing Cadavers

Analysis of Colored Feltipped Blending Markers Using Video Spectral Data, Gray Value Measurements, Thin-layer Chromatography, and Raman Spectroscopy

Development of a STR Multiplex for Forensic Identification of *Papaver somniferum*



# Academic Year 2017-2018

Heated Headspace SPME/MS for the Screening of Residual Psychoactive Substances in the Oral Cavity

The Characterization and Discrimination of Vehicular Greases, Transmission Fluids, and Brake Fluids

Comparing Factors that Influence Non-specific Amplification in Current Generation Commercially Available STR Genotyping Kits

Identifying Polymorphisms in the Carboxylesterase 1 (CES1) Gene Among a Juvenile Attention Deficit Hyperactivity Disorder (ADHD) Population Associated with Responses to Methylphenidate

Detection of Fentanyl Using Headspace Chemical Analysis

Design and Optimization of a Cost Effective, Massively Parallel Sequencing Workflow for Identifying Genetic Variants in the Carboxylesterase 1 Gene (CES1)

Identification of Novel Synthetic Benzodiazepines by MS

Development of Magnetic Carbon Nanotubes for Dispersive Solid Phase Extraction of Cyanide Metabolite (2-aminothiazoline-4-carboxylic acid) in Biological Samples

Quantification of Novel Synthetic Opioids in Blood Using MS/MS

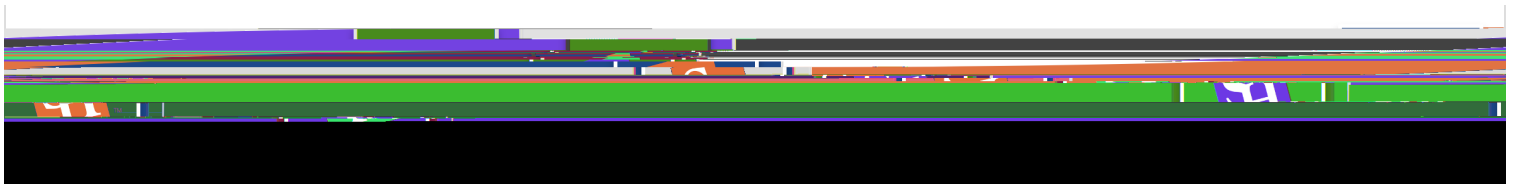
Screening of Fentanyl Analogs in Whole Blood Using QTOF Analysis

The Application of Gold Nanoparticles for Detecting Controlled Substances with Surface Enhanced Raman Spectroscopy (SERS) Using Portable Raman

Forensic Application of Microsatellite Markers to Dog DNA Testing

Screening for Fentanyl Analogs and Metabolites Utilizing Portable Raman and Immunoassay Techniques

Quantification of U47700 and Metabolites in Plasma by MS/MS





The Comparison of the Repeatability and Discrimination of the Yellow, Blue, and Red Fil  
for Refractive Index Measurements Using the Stage Method

## Academic Year 2016-2017

Genetic Analysis of Oxytocin and Serotonin-related Single Nucleotide Polymorphisms (SNPs)  
and Behavioral Assessment in Two U.S. Populations

Swab Collection and Room Temperature Preservation of DNA from Decomposing Human Skin

Determination of Methamphetamine and Amphetamine in Urine Using GC/MS

Alternate DNA Extraction and STR Profiling Strategies for Skeletal Samples

Using Microbial Clocks in Human Cadaver Ribs to Estimate the Postmortem Interval

Preparation of Cannabis and its Botanical Structures for Analysis by SEM/EDS

Detection of Cannabinoids from Buccal Swabs Using One Vial Headspace Derivatization  
Coupled with SPME/GC-MS

Evaluation of Instrument Sensitivity and Stability for Magnetic Flux Measurement Relative to  
Toner Area as a Screening Tool for Casework Application

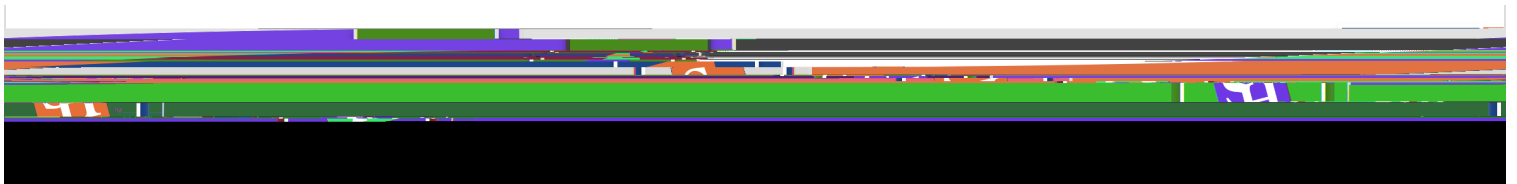
Quantification of Morphine, Codeine, and Thebaine in Home Brewed Poppy Seed Tea by LC  
MS-MS

DNA Degradation in Decomposing Cadavers and Gene Expression in Blood Deposits as  
Indicators of Postmortem Interval

Physicochemical Properties of Synthetic Cathinones: Implications for Postmortem Toxicology

Quantification of Suvorexant (Belsomra) in Blood Using QTOF MS

The Variation in Time of the Chemical and Morphological Properties of Postmortem Root  
Banding of Human Hair using Raman Spectroscopy and Microscopical Examinations



Optimized Extraction of Endogenous Gamma-hydroxybutyrate (GHB) in Hair Using LC/MS/MS

## Academic Year 2015-2016

Developmental Validation of a Chloroplast DNA Quantification System for Cannabis sativa Using Synthetic DNA as Reference Standards

Identification of Regioisomers via Gas Chromatography Coupled with Vapor Phase Infrared Detection

Comparative STR Success of Challenging Samples When Using the Small Versus the Large Autosomal Target in the Quantifiler® Trio Kit

Analysis of Single Nucleotide Polymorphisms in Genes Affecting Dopamine Turnover in a Sample of Caucasian Males

Sample Collection of Fire Debris from Burned Cadavers for Ignitable Liquid Analysis

Analysis of a New Hypnotic (Suvorexant, Belsomra®) in Biological Samples Using GC/MS

Genetic Study of Single Nucleotide Polymorphisms (SNPs) within Genes of Oxytocin (OXT) and Serotonin Transporter (5HT) in a Caucasian Male Student Population

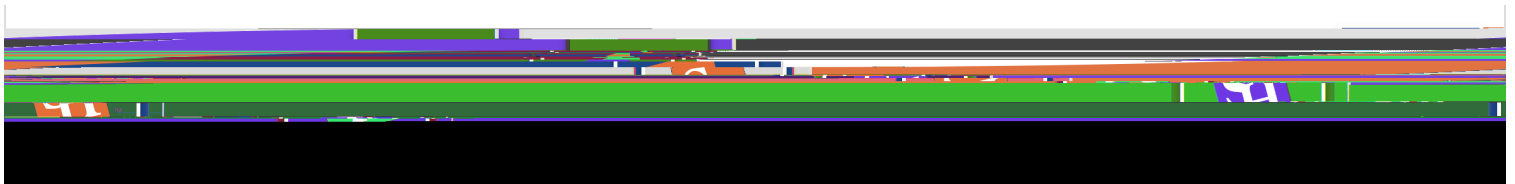
Comparative Tolerance of Short Tandem Repeat and Massively Parallel Sequencing Chemistries to Inhibited Samples

Changes to Human Bone During Decomposition in a Subtropical Humid Environment: An Experimental Histological Approach

Development and Evaluation of a miRNA System for Forensically Relevant Body Fluids Using Capillary Electrophoresis

Direct Examination of Synthetic Cannabimimetic Materials Using Ion Mobility Spectrometry for In-field Investigations

Chemical Profiling of Street-seized Cannabis sativa L. Samples Using MS Analysis



Analysis of a New Hypnotic (Suvorexant, Belsomra) in Biological Samples Using Q/TOF-MS

Analysis of DNA from Postblast Pipe Bomb Fragments for Identification and Determination of Ancestry

Headspace Chemical Analysis of Water Samples Contaminated with Early Stage Human Decomposition

The Effect of Impact on High Intensity Discharge (HID) Headlight Systems

## Academic Year 2014-2015

Identification of Mitragynine and its Metabolite in Biological Samples using High Resolution Mass Spectrometry

Genetic Study of SNPs in the Oxytocin Receptor

The Effectiveness of Various Whole Genome Amplification & Repair Methods to Improve STR Analysis of Formaldehyde-damaged DNA from Embalmed Cadavers

The Identification of Synthetic Cathinones Using LC/TOF-MS

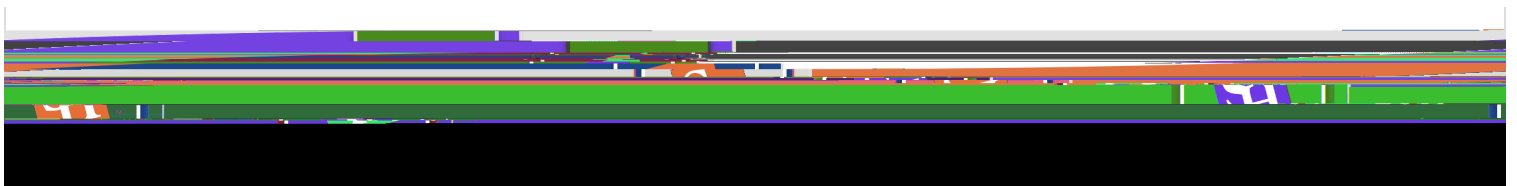
The Effect of Decomposition on the Shooting Distance Determination of Cranial Gunshot Wounds

Rapid Detection and Characterization of Cannabimimetic Materials: Efficacy of Using Ion Mobility Spectrometry for Field Investigations

Using DNA Profiling to Discriminate Marijuana Sources

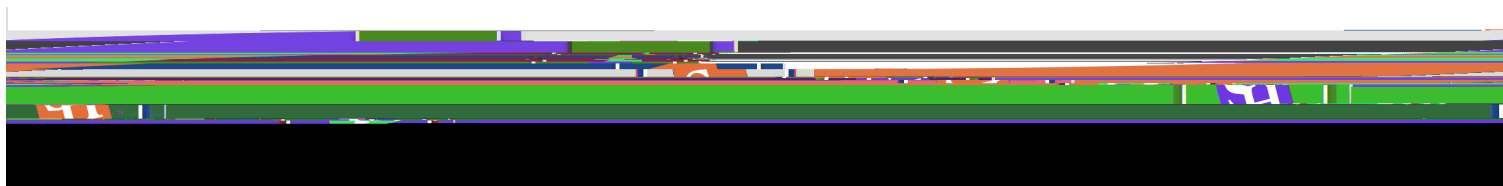
Method Development and Validation Studies: Chemical Profiling of Simulated Cannabis Samples Utilizing Gas Chromatography-Mass Spectrometry for Forensic Science Investigations of Street-Seized Samples

Comparison of DNA Yield & STR Success Rates from Different Tissues in Embalmed Bodies



# Chemical Profiling of Seized Marijuana Samples of Headspace Blade Microextraction Coupled with Gas Chromatography-Mass Spectrometry

Evaluation of a Simple One





# Academic Year 2011-2012

Developmental Validation of the LINE 1 Marker for Use in a Sensitive RealTime PCR Quantification Method

Determination of Endogenous Gamma-Hydroxybutyrate (GHB) in Human Hair

Extraction of Methamphetamine and Amphetamine from Postmortem Samples using a Molecularly Imprinted Polymer for Solid Phase Extraction (MISPE)

Using SNPs to Determine the Association Between MAO, COMT, and DBH and Aggressive or Violent Behavior

Association Between Aggressive Behavior and the Androgen Receptor, Monoamine Oxidase A, and Serotonin Transporter Polymorphisms

The Detection of ATCA in Human Liver Autopsy Samples by Using LC/MS/MS

A Comparison of Alprazolam Concentrations in the Blood and Urine Using Solid Phase Microextraction

Detection of Beta-Keto Amphetamines in Biological Samples

Analysis of Postmortem Hair Banding by Raman Microscopy

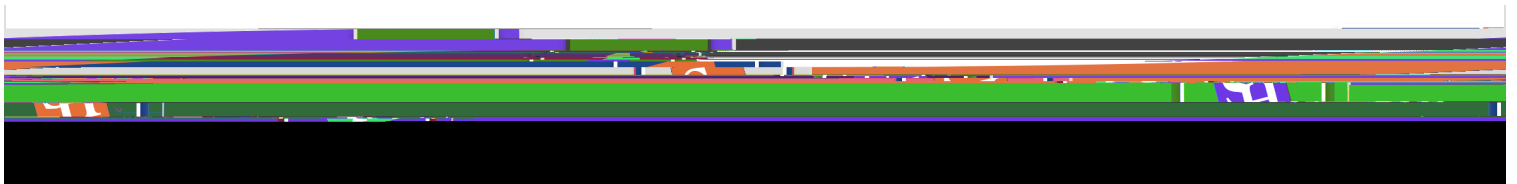
Analysis of Designer Amphetamines in Hair by LC/MS/MS

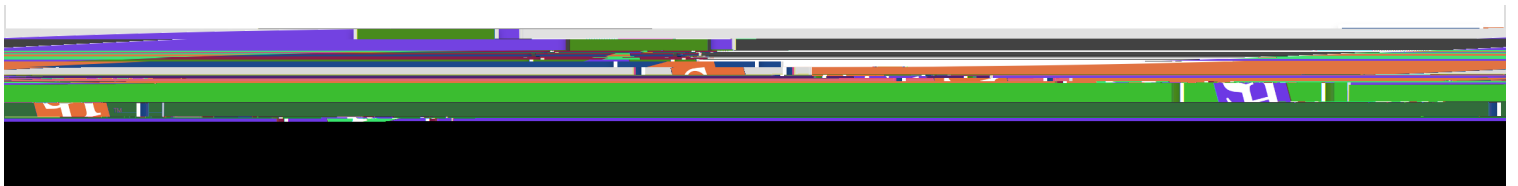
A Molecular Approach: Species Composition of the Maggot Mass in Human Cadavers in the Pineywoods Ecoregion of Southeastern Texas

Analysis of Trace Condom Material with the use of Pyrolysis Gas Chromatography/Mass Spectrometry

Genetic Structure of the Buenos Aires Population (Argentina)

Validation of DNA Extraction from Tissue Samples for Forensic Casework on the Automated QIA Symphony SP Platform





# Academic Year 2009-2010

Psychedelic Amphetamines in Blood and Urine by GC/MS

Comparative Study on Stability of DNA in Vitreous Humor, Cartilage, Tendons, and Nails for use as Alternative Sample Tissues in the Identification of Decomposed Cadavers

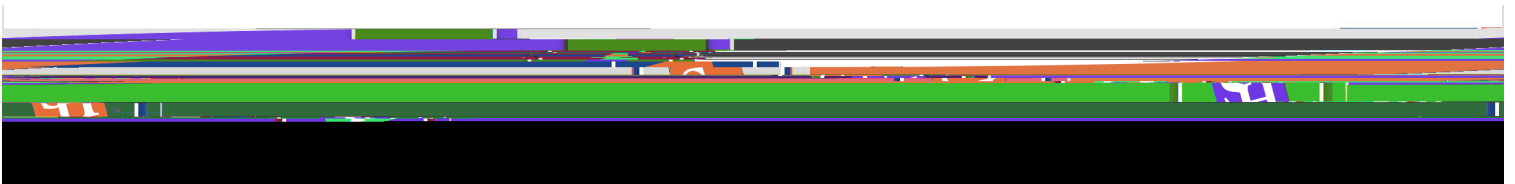
Determination of Psychedelic Amphetamines in Blood and Urine by LC/MS/MS

Study on SNPs relating to Ethnicity and Hair/Eye Pigmentation in a population of Texas

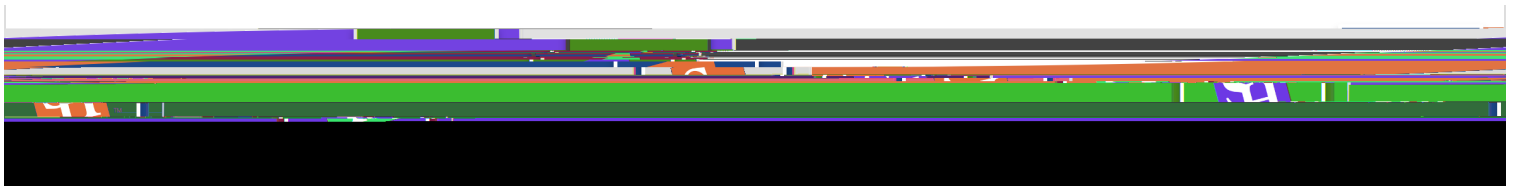
Quantitative Analysis of Salvinorin A (Salvia) in Biological Samples by LC/MS/MS

Endogenous  $\beta$ B in Human Hair: Comparison of Chemical and Enzymatic Digestion

Application of mini







Validation Study of Scanning Electron Microscopic (SEM) Examination of Firing Pin Impressions

Probing Single Stranded DNA Using Bioconjugated Quantum Dots

The Development and Employment of an Analytical Scheme to Determine the Discrimination Value between Automotive Paint Samples

Determination of Endogenous GHB Concentrations in Human Hair

Effects of Alternative Sources of Alcohol on the SCRAM Device

Screening and Quantitation of 24 Common Drugs of Abuse in Whole Blood

Analysis of New Designer Amphetamines in Urine Using Immunoassay, MS and LGMS-MS

Investigation of Stability and a Novel Derivatization of GHB using GC/MS

Molecular Characterization of Forensically Significant Insects with Applied Molecular Identification of Skeletal Remains in Southern Texas

## Academic Year 2006-2007

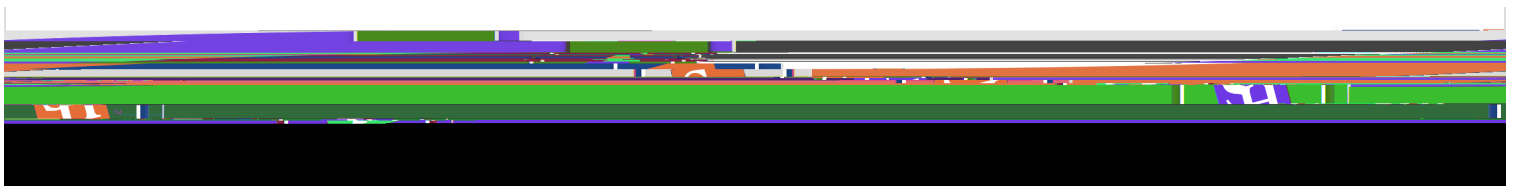
Quality Assurance/Quality Control Issues Arising with Fingerprint Evidence in a Post-9/11 World

Driving Behavior and Impairment Symptoms in Cannabinoid Positive Subjects Arrested for Driving Under the Influence of Drugs (DUID)

Tramadol: Analysis and Interpretation in Human Performance and Death Investigation Casework

Current Practices and Advances in Crime Scene Investigation

Methamphetamine Intoxication: Case Studies of Impaired Drivers and Related Fatalities



Driving Under the Influence of Methamphetamine: Comparison of Driving Behavior and Impairment Symptoms in Subjects Arrested for Driving While Intoxicated (DWI)

Validation Study to Determine the Highest Observed Stutter Peaks for Short Tandem Repeats (STRs)

Analysis, Use and Effects of Sedative Hypnotics For Forensic Implications

Glyphosate: Analytical and Forensic Implications of a Common Herbicide

An Analysis of Literary and Judicial Challenges on the Credibility and Admissibility of Evidence Submitted by Firearm Identification Laboratories

