

MSFS Research Topics:

2021-2022:

- Sens enhancement of GSR,
- Determining the method threshold for the identification of gasoline from laminate flooring,
- Determining the method threshold for the identification of gasoline from nylon carpeting,
- Evaluation of WGA on Digested DNA and DNA profile success,
- Individualization of DNA from *Quercus alba* using RT-PCR and HRM analysis,
- NGS of mtDNA extracted from historic human remains,
- PCR HRM Assay for the detection of *Campylobacter* and other foodborne pathogens,
- A single cell assay for the identification of body fluids,
- The examination of chromophoric chemical tests to detect and identify gunshot residues produced by frangible ammunition,
- Using FISH to screen for genetic abnormalities,
- Use of comet assay for the detection of DNA degradation of cellular samples,
- Detection of the effect of fire on genetic profiles,
- Comparison of DNA profiles with and without whole genome amplification for modern and historic bones,
- The effect of additional PCR cycles on genetic profile quality when amplifying historic and modern skeletal samples with the Qiagen Investigator 24 plex kit

2022-2023:

- Obtaining a STR DNA profile from fly maggots days after feeding on human flesh,
- Obtaining a STR DNA profile from wicked pads in serology test kits,
- DNA extraction and DNA typing of 12 soil samples from sites from Mid-Atlantic states,
- DNA extraction and STR DNA typing of dyed and natural human hairs,
- Development of a PCR melt assay to differentiate smokers and non-smokers via DNA Methylation,
- Disease association of STR and SNP loci used in forensic DNA genotyping,
- Generating a human STR DNA profile from Dermestid beetles,
- GCMS analysis of aging inks,
- Attribution of charcoal lighter fluids to manufacturer,
- Quantification of mitragynine and OH_ mitragynine in kratom drinks,
- Determining the method threshold of gasoline from laminate flooring,
- Differentiation of red lipstick using microRaman spectroscopy,
- Construction of a 3D printed device for the electrophoretic separation of cells,
- Individualization of twins using pyrosequencing,
- Effect of decomposition on DNA development,
- Development of a RT-PCR quantitation assay,
- Use of Imagen data for biogeographic ancestry and phenotypic characteristics.

2023-2024:

- Quantification of mitragynine and OH-mitragynine in kratom drinks,
- Determining the threshold for the identification of gasoline from carpet padding,
- Improving the extraction efficiency of BGT from OTC supplements,
- SERS enhancement of GSR,
- Quantification of bergamottin and dehydroxybergamottin in supplements by HPLC,
- Differentiation of pink lipstick using microRaman spectroscopy,
- SERS enhancement of analytes extracted from smokeless powders,
- A single cell assay for the identification of body fluids,
- Development of a RT PCR quantitation assay,
- Development of a RT PCR assay for the determination of eye color,
- Effects of water-based lubricants on Human STR profiles generated from SANE/SAFE kit swabs,
- NGS of soil microbial analysis for geolocation prediction using 16 rRNA Gene,
- Comparison of EZ1 and Dabney DNA extraction methods for phalanx and long bones of human remains,
- Development of PCR HRM assays for predicting hair color and determining the accuracy of a commercial NGS phenotyping kit,
- Discrimination of monozygotic twins via pyrosequencing and NGS,
- Development of HRM assays for *Legionella pneumoniae* and *Listeria monocytogenes*,