Project title: **Bait and Capture: Holding on to Molecules of Interest**
Principal Investigator: Brian Kemp, Washington State University
Contact Information: bmkemp@wsu.edu
Project Goal: The goal of this project is to identify methods that hold promise for more reliably recovering and typing CODIS profiles from LCN and degraded samples. The researchers will evaluate three different "DNA capture" methods for enriching CODIS marker DNA in LCN and degraded samples. These capture methods were originally developed for use with NGS in order to allow one to pre-select regions of interest and later subject them to high coverage sequencing.
NGS Technology: "Fishing for DNA", Primer Extension Capture, Mega-Probe Capture
Abstract: http://nij.gov/nij/topics/forensics/forensic-awards-abstracts-fy11.pdf (pp 11-12)
Project Status: Recently initiated

Project title: **Low cost post-mortem molecular genetic autopsy of sudden infant death syndrome (SIDS) and sudden unexplained death (SUD) in children and young adults**
Principal Investigator: Roger Kahn, Harris County Medical Examiner's Office
Contact Information: roger.kahn@IFS.hctx.net
Partner: Human Genome Sequencing Center (HGSC), Baylor College of Medicine
Project Goal: The purpose of this project is to develop, validate and implement a molecular genetic autopsy tool to aid in the determination of cause of death. This molecular autopsy tool will be based on second generation DNA sequencing technology and allow 27 genes that have previously been shown to play a role in arrhythmic sudden cardiac death to be fully sequenced in one test. The test cost will be less than $1000 per individual and take less than a week to complete.
NGS Technology: Roche 454
Abstract: http://nij.gov/nij/topics/forensics/forensic-awards-abstracts-fy09-10.pdf (p 189)
Project Status: Recently initiated

Project title: **Investigating Unexplained Deaths for Molecular Autopsies.**
Principal Investigator: Yingying Tang, New York Office of the Chief Medical Examiner
Contact Information: ytang@ocme.nyc.gov
Project Goal: The goal of this research project is to expand the knowledge on the number of genes in which mutations can cause or predispose individuals to sudden death. The researchers are using a two-tiered analytic method to identify sequence variations that influence susceptibility to SIDS and SUDS. They intend to determine both the significance and power of identified polymorphisms.
NGS Technology: Illumina MiSeq Sequencing System
Abstract: http://nij.gov/nij/topics/forensics/forensic-awards-abstracts-fy11.pdf (pp 49-50)
Project Status: Recently initiated

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NIJ Funded Research Related to Next Generation Sequencing Technologies

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Project title: **Next Generation Sequencing-based STR Mixture Deconvolution and STR Profiling of Degraded Samples**
Principal Investigator: Diane Rowold, Science Applications International Corporation
Contact Information: Point of contact: Ms. Cindy Nye: cindy.l.nye@saic.com
Project Goal: The project objective was to investigate affinity capture technology as a method to (1) generate complete, unambiguous CODIS STR profiles of acceptable quality from degraded or contaminated DNA and (2) achieve targeted DNA template selection as a front end for CODIS STR mixture de-convolution as mediated by next generation sequencing platforms.
NGS Technology: The focus of this work was the front end affinity bead capture. *The actual downstream NGS was not a primary focus of this research despite the misleading project title.*
Abstract: http://nij.gov/nij/topics/forensics/forensic-awards-abstracts-fy09-10.pdf
Project Status: Completed – the final report "CODIS STR Template Enrichment by Affinity Bead Capture and its Application in Forensic DNA Analysis" is available through the link: https://www.ncjrs.gov/pdffiles1/nij/grants/236431.pdf

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Project title: **Resolution of DNA Mixtures and Analysis of Degraded DNA Using the 454 DNA Sequencing Technology**
Principal Investigator: Cassandra Calloway, Children's Hospital & Research Center (CA)
Contact Information: scalloway@chori.org
Partners: California Department of Justice & Armed Forces Research Laboratory
Project Goal: The primary goals of this project are to 1) develop and optimize a 'front-end' multiplex PCR system for sequencing both nuclear STR and mtDNA markers using the 454 next-generation sequencing (NGS) technology and 2) validate and apply the NGS to forensically relevant samples and populations.
NGS Technology: Roche 454
Abstract: http://nij.gov/nij/topics/forensics/forensic-awards-abstracts-fy09-10.pdf (pp 187-188)
Project Status: In progress

Project title: **Assessing Deep Sequencing Technology for Human Forensic Mitochondrial DNA**
Principal Investigator: Mark Wilson, Western Carolina University
Contact Information: mrwilson@wcu.edu
Project Goal: The goals of this study are to assess the most cost effective means of performing deep sequencing reactions of amplified forensic DNA samples (mtDNA) from the perspectives of costs, ease of use, transferability, the depth of coverage and the reliability of the detection capability.
NGS Technologies: Roche GS-Junior instrument, Illumina IIx instrument, AB Ion Torrent
Abstract: http://nij.gov/nij/topics/forensics/forensic-awards-abstracts-fy09-10.pdf (p 184)
Project Status: In progress
