Development of analytical tools to detect hallmarks of genetic engineering to determine the type and location of the change and the penetrance of the modification in a population.

**Battelle Team and Facilities**

**Lead Investigator:** Dr. Rachel Spurbeck  
**Team Members:** Dr. Alisa Blazek  
Dr. Mike Dickens

**Facilities for Data Generation**
- Next generation sequencing capabilities on multiple platforms: Illumina, ThermoFisher, and Oxford Nanopore Technologies
- BSL-3 and BSL-2 state-of-the-art laboratories in microbiology, virology, molecular biology, and biochemistry
- Custom and all-scale test fixtures, including chambers for aerosol testing

**Capabilities and Qualifications**

**Subject Matter Expert Driven Data Curation**
Battelle brings subject matter expertise and unique approaches to big data mining.

**Data Analytics**
Developing and implementing novel genetic data analytics for forensics, and environmental and public health surveillance

**Systems Integration & Custom Software Development**
Battelle excels at integration of complex systems and custom software development.

**Our Approach**
- Develop gene editing tool mark dataset from literature for genome editing technologies such as:
  - zinc finger nucleases (ZFNs)
  - transcription activator-like effector nucleases (TALENs)
  - clustered regularly interspaced short palindromic repeats/Cas (CRISPR/Cas)  
    - Types I, II, and III
- Generate tool mark ontology
- Annotate sequence types with ontology categories
- Develop a detection tool to identify and score the probability that genome editing technology/genetic engineering was utilized in areas of genetic variation based on genomic data.

**Research Areas of Interest**

**Gene Editing Detection**
Signature database combined with rapid processing of deep sequence data to reveal purpose-manipulated genetic loci in organisms of interest

**Viral Population Dynamics**
Metagenomics approach to predicting disease spread and source traceability: custom extraction, deep sequencing (RNA-Seq) and efficient analytics pipeline to enable rapid characterization of viral quasi-species

**FELIX Partnering**
- Battelle envisions contributing to a team by offering subject matter expertise, data analytic development, and systems integration.
- Seeking partners with large datasets to be mined

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