

Project Overview

- Signature Science, LLC (SigSci) and the laboratory of Dr. Lydia Contreras at the University of Texas at Austin have relevant capabilities, past performance, and novel insights related to non-invasive biodosimetry methods
- While our team has studied biodosimetry markers across a wide range of tissues and doses, we are particularly interested in the utilization of markers associated with the human microbiome, virome, and host, and the methods by which these signatures could be evaluated for rapid, non-invasive biodosimetry detection for individuals or forensic samples
- Adopt a multi-omics approach to assess various signatures of low dose radiation exposure and employ statistical frameworks to integrate data and predict exposure states from non-invasive or trace samples

Teaming Overview

- The Contreras Lab has worked with exposures ranging from 0.1–100 Gy. SigSci has investigated a wide range of exposures and potential signatures (including proteomic and transcriptomic), some of which meet the target range of < 2 Gy, but many of which require higher doses for accurate assessment.
- IRB and IACUC for human subject research and animal studies
- Relevant Experience (SigSci):
 - SigSci has developed multiple skin surrogates to model the growth, persistence, and change of microbial communities on skin.4 These skin surrogates would provide a way to simulate various microbial communities and evaluate the impact of short- and long-term radiation exposure without requiring use of human subjects.
 - BSL2+ facilities, tissue culture facility, high throughput next generation sequencing and informatics processing, data analysis, statistics, and machine learning capabilities
 - SigSci has performed as a prime contractor on numerous IARPA programs including Proteos, FunGCAT, MAEGLIN, and multiple seedling efforts
 - Bacterial and cell-based culturing, manipulation, engineering, and assay development expertise demonstrated through multiple DARPA and IARPA-funded projects
 - Broad range of proteomic, proteogenomic, and metabolomic analysis capabilities and instrumentation including nanoflow liquid chromatography and high resolution, accurate mass, spectrometry
 - Human forensic experience extracting biological signatures from trace amounts of human samples for analysis
- Relevant Experience (University of Texas):
 - The Contreras Lab has considered, and have access to facilities for, working with either mouse or *C. elegans* microbiomes to track the long-term effects of ionizing radiation exposures
 - Previous experience utilizing bacterial (aerobic and anaerobic) and eukaryotic (yeast) systems, in addition to cultured human lung cells
 - Broad experience using biochemical approaches, genetic studies, large-scale “omics” data, and bioinformatics

TEI-REX Teaming Profile
Signature Science, LLC
University of Texas – Laboratory of Dr. Contreras

- Previous successful identification of transcriptional markers of ionizing radiation exposure at and below 1 Gy in two bacteria, including a member of the human microbiome as part of a DTRA funded program

Teaming Needs

- Open to collaborators with experience in:
 - Biodosimetry and radiation biology
 - Radiation dosimetry/health physics
 - Novel “-omics” approaches to integrate into a multi-omics approach
 - Access to relevant samples

Contact Information

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