Los Alamos National Security, LLC Request for Information on how industry, not-for-profits, and universities may partner with the Laboratory on genome science efforts.

Los Alamos National Security, LLC (LANS) is the manager and operator of the Los Alamos National Laboratory (LANL) for the U.S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) under contract DE-AC52-06NA25396. LANS is a mission-centric Federally Funded Research and Development Center focused on solving the most critical national security challenges through science and engineering for both government and private customers. LANL has advanced expertise in genomic science for use in public health, environmental microbiology, algal bio-fuels, and other applications.

GILA
Genome Institute of Los Alamos

GENOME SCIENCE FOR NATIONAL SECURITY

The Los Alamos genome science capability is a resource that serves a unique role in the national security R&D enterprise. The creation of the Genome Institute of Los Alamos (GILA) will build upon the existing strengths of LANL and its partners. This Institute will formalize a structure for outreach, reach-back and educational efforts and pursue an innovative new business model for genome science that maintains our cutting edge experimental and computational capabilities to support funded projects in national biosecurity, human health, international bio-engagement, biofuels, and food safety.

Highlights:

1. GILA will enable utilization of LANL leadership and expertise in genome science to address commercial and academic research challenges while enhancing the LANL capabilities to address national mission.

2. GILA will provide the mechanisms to build an intellectual community around genomic science to explore new R&D avenues.

3. GILA will provide a pipeline of trained next generation genomicists nationally and internationally who will have the skills to use the latest genomics technologies to solve R&D challenges.

4. GILA will provide a mechanism to develop partnerships with key industry and university partners to tackle the toughest genome science challenges.

Background:
Genomic research at LANL has roots beginning in 1945 based in radiation health effects on radioactive material workers. By 1967, Los Alamos laser engineers and biological scientists designed and constructed flow cytometry systems that allowed the identification and sorting of individual chromosomes. This foundational technology provided the basis for many modern commercial flow cytometry systems. The ability to sort individual human chromosomes led to creation and funding of the National Laboratory Gene Library Project, where LANL was a major international player in developing gene cloning systems and creating gene libraries for each human chromosome. The 1980's through the 1990's saw LANL developing international genomic data storage databases (Genbank), and being a foundational partner in the DOE-Human Genome Project (HGP). LANL's role in the HGP included cloning, mapping, and sequencing of Human chromosome 16, development of bioinformatics systems to analyze and store mapping and sequencing data, and development of large scale integrated automation platforms to screen large clone libraries. Activities started in the HGP era catalyzed work still ongoing at LANL including the HIV database, the High Throughput Laboratory Network, and sequencing and analysis activities in the Genome Science Programs team.

Since the late 1990's, LANL has been a partner institution in the DOE's Joint Genome Institute (DOE-JGI), and has sponsorship from federal customers like the Defense Threat Reduction Agency and the Department of Homeland Security. GILA specializes in high-throughput genomics, including draft sequencing, genome finishing, transcriptome and metagenome sequencing as well as genome analysis in support of DOE, Department of Defense (DoD) and national security missions including pathogen biology, bioenergy, and bioremediation. GILA has access to 7 BSL-1 & 2 BSL-2 laboratories and one BSL-1 automation laboratory that house a significant number of high-throughput automation and robotics systems, and one Illumina MiSeq sequencer, one Illumina HiSeq2000 sequencer, one Pacific Biosciences RSII sequencer and two Ion Torrent sequencers. GILA's computational resources are housed within LANL's High Performance Computing division and include approximately 100 servers with more than 2000 cores, 12 TB of memory and over 300 TB of usable storage. These systems are used for genome data acquisition, data quality control, sequence assemblies, annotation, as well as comparative, transcriptomic, phylogenetic and metagenomic analysis. These resources are continually being expanded and upgraded.

LANL's leadership in these areas has enabled development of programs like international bio-engagement, sponsored by the Departments of State and Defense, that involve establishing genome centers and research collaborations in the former Soviet Union, Middle East, Africa and Asia. Further, as the field evolves into newer generation sequencing instrument platforms, LANL has taken an strong leadership role in post-sequencing analytics.

POTENTIAL AREAS FOR COLLABORATION

LANS has identified several areas for potential partnership for GILA:

- Advanced sample preparation techniques and new technologies relating to sequencing and genomics
- Advanced sequencing approaches including new instrumentation and other technologies for sequencing work
- Develop genomics applications for:
    - Human health (general)
    - Human health (infectious disease detection and characterization)
    - Food safety
    - Agriculture
    - Biofuel development and optimization
    - Forensics
- Advanced bioinformatics:
    - Read-based analyses (including read-based classification and pathogen detection)
    - Genomic reference databases
    - Global gene expression profiling
    - Comparative genomics and metagenomics
    - Phylogenetic and molecular evolution analyses
- Develop and perform training programs for:
    - Genome centers in partner countries
    - Vendor workshops oriented around advanced training on vendor platforms and devices
    - Academic training

Please note that the foregoing table is non-exhaustive, and LANS is open to collaboration in any suitable field that supports the Laboratory's primary mission deliverables. To that end, LANS is opening this formal Request for Information to industry and the not-for-profit research sectors to gauge the level of interest and potential for a strong collaboration in advancing GILA. This offering is made without prejudice to any form of agreement, collaborative arrangement, alliance, number of entities, or partnering mechanism. Those companies interested in pursuing this opportunity should direct a Letter of Interest, as well as any comments or questions, to the undersigned on or before 11:59 MDT on Friday, February 27, 2015.

Below you will find a listing of certain attributes preferred by LANS for collaborators. Please properly mark any information that is considered proprietary or business-sensitive. LANS will supply a Non-Disclosure Agreement to any entity or person that requires it.

PREFERRED PARTNER ATTRIBUTES

Private sector, academic and/or nonprofit entities possessing knowledge and expertise in:

- Sample preparation reagents and appropriate protocols
- Sequencing instrumentation and service support
- Sequencing reagents and protocols
- Bioinformatics analysis software and hardware
- Bioinformatics/genome sciences training materials and resources

The foregoing are negotiable preferences; LANS welcomes all Letters of Interest from any suitable party.

WHAT WE ARE REQUESTING

Please submit a written response on how your organization envisions engaging with LANL to participate in GILA. This may include a business or product plan, a business model, or just information regarding your company with contact information. We look forward to reviewing your ideas on how together we can bring the Genome Institute of Los Alamos (GILA) to the private, academic, and not-for-profit sectors. Please respond by email to kathleen_m@lanl.gov, or call Kathleen McDonald directly at (505) 667-5844 by Friday, February 27, 2015. You will be contacted in a timely manner upon receipt of this information.