**FACILITIES AND OTHER RESOURCES**

FACILITIES

Dr. Xinkun ‘Sequen’ Wang directs the Northwestern NUSeq Core Facility. NUSeq is the only Northwestern University-wide Facility to support genome research, with the mission to providing infrastructure and expertise on state-of-the-art genome sequencing capabilities and other genomics technologies to Northwestern and affiliated researchers. Besides wet lab operations, bioinformatics and data mining are also an integral component of the NUSeq service line to support investigators in extracting rich biological information from high-throughput genomics data. NUSeq has 3000 sq. ft. wet lab space and 200 sq. ft. bioinformatics dry lab space on the Chicago campus, providing easy access to all Northwestern investigators.

Major technologies available at NUSeq include next-generation sequencing (NGS), microarray, droplet digital PCR (ddPCR), real-time quantitative PCR, for whole genome/exome/gene panel sequencing, transcriptomics (bulk RNA-seq, single-cell RNA-seq, and spatial transcriptomics), global and targeted genotyping, epigenetic/epigenomic changes (both methylation sequencing and methylation EPIC array analysis), DNA-protein interaction, 3D genome and DNA accessibility, and metagenomics. For spatial transcriptomics, the Core is equipped with 10x Genomics Visium/Visium HD, Xenium, and STOmics Stereo-seq. Major sequencers include Illumina NovaSeq X Plus/6000, HiSeq 4000, NextSeq 500, MiSeq, Element AVITI, Complete Genomics DNBSEQ-G400, as well as long read sequencers such as Oxford Nanopore and PacBio Revio. Other essential genomic/genetic services offered by the Core include automated and manual DNA/RNA extraction, DNA/RNA sample QC and measurement, cell line authentication, and Sanger sequencing (via a partnership with Chicago-based ACGT, Inc.). On the bioinformatics front, the Core provides data analysis and data mining services for NGS and microarray data generated in-house or externally.

NUSeq provides computer workstations for Core personnel. Northwestern University provides Ethernet connections and Internet access for NUSeq workstations with direct access to the University libraries and their databases, and intranet- and internet-based major biological databases. The Core maintains a large collection of commercial and open-source software packages for genomics data mining, including a variety of Java/Perl/Python/R programs, DNASTAR Lasergene, etc. NUSeq has full access to the Northwestern University’s high-performance computing cluster called Quest. The Genomics Compute Cluster on Quest provides 80 compute nodes and a combined 4,040 cores to foster and empower computational genomics research including RNA-Seq, ChIP-seq, single-cell analysis, whole genome/exome analysis, etc. For long-term genomics data storage, NUSeq uses university-provided on-premises storage backed up by Northwestern IT and cloud storage.

NUSeq has office space on the 2nd floor of Tarry Research Building and the 4th floor of Morton building (directly connected to Tarry) for director/business admin/wet lab staff, and the 11th floor of Rubloff Building for associate director and bioinformatics staff. Dr. Wang has a fully equipped office in Tarry. The office is fully equipped with desk, chairs, file cabinets, bookshelves and computer station. The Ethernet allows access to the Internet and connects to the University Libraries to perform literature and database searches directly. Dr. Wang and NUSeq have full access to the Genomics Compute Cluster on Quest, on-premises data storage, and cloud-based storage.

OTHER RESOURCES

- Thorson Goodall Diagnostic Molecular Biology (DMB) laboratory at Northwestern Memorial Hospital: DMB is a state-of-the-art lab that is a nationally recognized leader in molecular diagnosis and a Roche Molecular Center of Excellence. Besides providing clinical diagnostics and clinical training activities for Northwestern Medicine, DMB also provides translational and clinical research support to a variety of Northwestern centers and institutes. NUSeq operates under DMB CLIA license for patients testing and has access to DMB instrumentation and team members if needed.

- Northwestern NUgene Facility: As a genomic biobank, NUgene collects and stores nucleic acid samples and associated health information from patients at Northwestern Medicine–affiliated hospitals and clinics. Besides providing biobanking, the samples collected can also be requested and used by scientists to examine the role genes play in the development and treatment of common diseases. The health information collected is both self-reported and periodically obtained from the participant's electronic medical record at Northwestern. NUgene is Institutional Review Board–approved and compliant with the Health Insurance Portability and Accountability Act.

- Northwestern Pathology Core Facility (PCF): PCF is a centralized, comprehensive, core laboratory providing full pathology services for human tissue-based studies, including histology, immunohistochemistry, molecular analysis, and microscopic examination. The Facility is College of American Pathologists (CAP) accredited and CLIA certified. In addition to the laboratory services, PCF also performs procurement of fresh biospecimens for clinical trials and biobanking. Both located at downtown Chicago, NUSeq and PCF work closely on projects that require both genomics and pathology expertise.

- Northwestern Supercomputing Infrastructure: Provides computing resources and support to Northwestern researchers. Major computational resources include high-performance computing, secure on-premises and Cloud data storage and file sharing, data analysis tools, global data transfer networks, and customized computational solutions.