

GENOMICS & BIOINFORMATICS CORE FACILITY

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The facilities at the University of Notre Dame will support the successful completion of this project in several ways. The Notre Dame Genomics and Bioinformatics Core Facility (GBCF) is a 1500 square foot facility that houses specialized equipment for DNA and RNA quality control, Illumina sequencing, and 10X single cell and spatial transcriptomics applications. Sequencing equipment includes an Illumina MiSeq, Illumina NextSeq2000, and an Applied Biosystems 3730xl 96-capillary sequencer. The facility supports single cell and spatial transcriptomics through its 10X Genomics Chromium iX, Visium CytAssist, and Xenium Analyzer systems. Quality control equipment includes a Countess II FL cell counter, Agilent 2100 Bioanalyzer and 4200 TapeStation Systems, Qubit 4.0 Fluorometer, Molecular Devices SpectraMax iD3 plate reader, BioRad CFX Opus Real-Time PCR Detection System, Sage Science BluePippin, and Covaris S220. The GBCF is an approved BSL2 facility. Cost effective sequencing for high-throughput sequencing projects is achieved by outsourcing through negotiated contracts. A managing director, research technician, and two technical specialists are employed full-time in the genomics laboratory. Personnel are responsible for operating and maintaining the equipment listed above and have received training from respective manufacturers in machine maintenance and experimental methods. The GBCF provides comprehensive consultation and support for library preparation and sequencing for both off-the-shelf or custom workflows. Comprehensive bioinformatics support is offered through our Bioinformatics faculty director for on-demand consulting, software and database support for common analyses, development and distribution of documented workflows, and full-scale analysis of genomic data.

The main computational resource for research computing is through the university's Center for Research Computing (CRC). The CRC operates a state-of-the-art High Performance Computing (HPC) facility providing advanced computing support to researchers within Notre Dame, the local community and industry. The facility is highly secure and reliable and can be accessed securely and seamlessly. The High Performance Computing (HPC) team manages parallel supercomputers, clusters, grid networks and storage (around 23,000 cores and 3000TB of storage) which provide exceptional levels of processing speed and power. In addition, the GBCF has partnered with the CRC to deploy *dedicated* high memory nodes (up to 2TB, tens of cores) for bioinformatic analyses. These nodes are attached to the main data storage system on campus, allowing use of either CRC and GBCF hardware without having to transfer data. Finally, the GBCF maintains a community allocation through the NSF ACCESS program, providing access to the PSC Bridges2 cluster, with up to 12TB of memory per node, and Jetstream2, a scientific cloud platform that can host genome browsers, shiny servers, and other web-based tools for research.