

NIH Grant Resources

Equipment

- Illumina NovaSeq 6000 Sequencing System
- Illumina MiSeq Sequencing System
- Illumina iScan and iScan accessory equipment
- 10X Genomics Chromium System
- Envirogen EVOS M7000 for 10X Visium technology
- Eprelia HM 355S automated Microtome for 10X Visium technology
- Thermo Scientific CryoStar NX70 Cryostat for 10X Visium technology
- NanoString GeoMx DSP system
- Mission Bio Tapestry Platform
- Agilent SureScan Microarray Scanner
- Agilent Bravo
- Bio-Rad CFX 96 real-time PCR system
- Agilent 2200 TapeStation
- Agilent 4200 TapeStation
- Tecan infinite M200 pro
- Covaris S220 High Performance Ultrasonicator

Server Computers

- Illumina NovaSeq 6000 NGS data processing server: Dell PowerEdge M640 Blade Server; Dual Intel Xeon Gold 6152 CPUs @ 2.10GHz, 44/88 cores; 768GB RAM; Dual 10Gb fibre networking. The cluster includes a 120TB dedicated storage array server, a compute node comprised of 88 cores (hyperthreaded), and 768GB of memory with access to additional cpu's on other compute nodes if needed.
- Illumina NGS data processing server: 40TB hard drive array comprised of four (4x) Dell PowerEdge R610 Servers - each server node containing eight CPU quad cores at 2.27GHz and 48GB RAM
- Four additional compute nodes: dual Intel Hex-cores (24 cores each) with 128GB RAM
- All compute nodes are 1Gb/s interface and 10Gb/s between storage nodes
- Illumina NGS data storage arrays: two (2x) 100TB hard drive array – each array containing six CPU hex cores and 32GB RAM, and 100TB reserve space available

- 480TB of near on-line tape backup (quantum i80 dual LTO-6) with unlimited off-line storage
- Illumina NGS data transfer (SFTP) server: 10TB hard drive array, four CPU quad cores at 3.2GHz, and 24GB RAM

Bioinformatics Packages

- Illumina iScan Control Software
- Genome Studio
- Ingenuity Pathway Analysis Software by Ingenuity
- Sequencing Control Software, SAV Viewer by Illumina
- BaseSpace by Illumina

Facilities

The GSR has over 1800 square feet of lab space and is centrally located in Research Complex 2 on the Anschutz Medical Campus of UCD.

The facility is in close proximity to over 60% of the customers as well as BBSR, FCSR, FGSR and PSR with which the GSR interacts regularly.

The GSR houses state-of-the art equipment, including Illumina NovaSeq 6000 and 10X Genomics Chromium and Visium Spatial technology.

The NovaSeq 6000 System leverages Illumina sequencing by synthesis (SBS) and patterned flow cell technology to deliver accurate and unmatched level of throughput of DNA sequence data. SBS detects single bases as they are incorporated into growing DNA strands, reading billions of sequences in parallel. Patterned flow cells contain billions of nanowells at fixed locations delivers significant increases in sequencing reads and total output of the system.

The NovaSeq 6000 offers 80 - 6000 Gb output per run with 13 - 44 hours running time. It supports multiple read lengths 50 - 250 bases in paired-end format that support diverse applications including whole genome, exome, methylation, ChIP, transcriptome and 10X Genomics single cell and spatial gene expression sequencing.

The NovaSeq 6000 System integrates with the BaseSpace® Sequence Hub to provide an easy, secure, and cost-effective way to store, analyze, and share genomic data. Powered by Next GEM technology, the 10X Genomics suite of Chromium Single Cell

products offer solutions to capture the full heterogeneity of a cancer sample, in tens of thousands of cells, including gene expression, cell surface proteins, immune clonotype, antigen specificity, and chromatin accessibility.

Visium Spatial Gene Expression is powered by spatially barcoded mRNA-binding oligonucleotides on slides that allows scientists to measure all the gene activity in a tissue sample and map where the activity is occurring. Each slide can contain either two or four Capture Areas with approximately 5000 barcoded spots, containing millions of spatially barcoded capture oligos. Released tissue mRNA binds to these oligos enabling capture of gene expression information.