

A venue for exploratory high-risk, high-reward genomics-based studies.



About

The Genomics Core Facility's service model fills a critical gap in genomics research. We offer custom services that leverage cutting-edge technologies and next-generation sequencing capabilities to support investigators as they move their genomics-based projects from basic ideas through exploratory feasibility studies to project completion.

Established in 2015 by the Center for Personalized Cancer Therapy (CPCT), the Genomics Core Facility supports early-stage, technically challenging, or high-risk genomics projects, particularly those with potential for future clinical translation. The Genomics Core Facility's mission aligns closely with CPCT's goals to advance biomarker discovery, anti-cancer therapeutic development, and reduce disparities in cancer care.

Services

- Research design guidance
- Custom research protocol development
- Student training on laboratory techniques, including library preparation
- Bioinformatics services, including sequence alignments to consensus sequences using the UMass Unity Cluster (high-performance computing cluster), tailored analytic algorithms, and project-specific analysis approaches

Spotlight on Spatial Transcriptomics

10X Xenium Analyzer

Characterize up to 5,000 genes in-situ with ultra precise single cell spatial imaging with 10X Xenium Analyzer



10X Visium CytAssist

Spatially resolved transcriptome mapping from fresh frozen, fixed frozen, or FFPE tissue slides
High cellular resolution (1-10 cells per spot with SD, single cell with HD assay)



Images Courtesy of 10X Genomics

Next Generation Sequencing and Library Preparation



Illumina NextSeq 2000 Sequencing

- Newly reduced prices with XLEAP SBS Reagents
- Highly flexible sequencing for 1M–1.8B zreads per flow cell and read lengths up to 300 bases in length
- Custom primers and sequencing parameters available upon request



Tecan Fluent 780 DreamPrep Liquid Handler

- Expert automated preparation of Illumina-compatible sequencing libraries for total RNA, mRNA, miRNA, ChIP, cut-and-run, bisulfite, WES and amplicon sequencing

Additional applications available, please contact the core for details



10X Chromium and Chromium X

- High-throughput automated cell partitioning and 10X Genomics library preparation for single cell sequencing
- Compatible assays include Single Cell Flex GX, Universal 3' and 5' GX, ATAC, and Multiome ATAC + GX including immune profiling and CRISPR screen options

Data Analysis



Dell Precision 5860 Bioinformatics Workstation

- High-throughput automated cell partitioning and 10X Genomics library preparation for single cell sequencing
- Compatible assays include Single Cell Flex GX, Universal 3' and 5' GX, ATAC, and Multiome ATAC + GX including immune profiling and iCRISPR screen options

Sample and Library QC



Agilent 4200 TapeStation Sample QC

- Electrophoresis-based qualitative assessment, library sizing and purity analysis of DNA between 10pg/ul-50ng/ul and RNA between 1-500ng/ul
- D5000, D1000, D1000 HS, RNA Broad, and RNA HS assays available



Agilent 2100 Bioanalyzer Sample QC

- Microfluidic lab-on-chip based assessment of sizing, quantitation, integrity and purity from DNA, RNA, and proteins
- DNA1000, DNA HS, RNA Nano, RNA Pico, and Protein assays for up to 80 or 230kD available
- Reliable, highly reproducible results from just 1ul of sample!



Qubit 4.0 Fluorometer

- Fast and highly specific dye-based quantitation of DNA, RNA, and protein in less than 3 seconds per sample
- Qubit RNA IQ assay available to screen for RNA degradation

Biomarker Validation and Quantification



QuantStudio 12K Flex qRT-PCR

- Equipped with a 384-well plate block and available for SYBR Green or Taqman probe qRT-PCR as a service or for customer self-use
- Used to accurately quantify all libraries and pools for sequencing



QuantStudio 3

- Equipped with a 96-well plate block and available for SYBR Green or Taqman probe qRT-PCR as a service or for customer self-use

Nanostring PrepStation and nCounter Max

- Compatible with any sample type (FFPE, FF, blood, lysates, exomes, etc.)
- Curated and custom panels available for up to 800 genes including off-the-shelf panels for many cancers



Genomics Core Facility Team

Director: **Jill A. Macoska**, PhD, Director, Center for Personalized Cancer Therapy; Distinguished University Professor of Science and Mathematics; **Alton J. Brann** Endowed Chair; Professor of Biology

Director: **David Liu**, MD, Oncologist, Dana Farber/Harvard Cancer Center, and Assistant Professor of Medicine, Harvard Medical School

Bioinformatics Lead: **Kourosh Zarringhalam**, PhD

Manager: **Susan Patalano**, BS

Technician: **Michaela Mulhearn**, BS



umb.edu/genomicscore



100 Morrissey Blvd., Boston, MA



genomicscore@umb.edu



617.287.3956



UMass Boston Research Core Facilities

Contact us to find out more about our services!