The DNA Sequencing Core at The University of Michigan provides high-quality, low-cost DNA analysis for researchers on a recharge basis. The Core operates several labs at the University of Michigan Ann Arbor campus, with 30 highly-trained individuals on staff to help you. We operate a variety of instruments designed to help you assess the quality of your DNA and RNA and prepare it for analysis.

**List of Services**

**SEQUENCING**
- **Sanger Sequencing:** The Core provides our clients with high-quality, extremely cost-effective DNA sequencing of PCR products, plasmids, siRNA constructs, DNA fragments, and large DNA templates including plasmids over 20 kb, cosmids, lambda clones, P1 clones, BACs, and bacterial genomic DNA. Standard processing time is within two business days after receipt. Next and Same Day Rush service is also available upon request.
- **PyroMark** is a fully integrated system that provides real-time sequence information and is highly suitable for epigenetics research and genetic analysis.

**NEXT GENERATION SEQUENCING**
- **The Core offers sequencing services** on Illumina HiSeq 4000, HiSeq 2500, NextSeq and MiSeq instruments. We offer a range of read lengths as well as output. We can provide 1 million to over 400 million reads per lane depending on the instrument and output selected. Clients can submit libraries that they have prepared or submit samples to us and we will make the libraries. High-throughput automated library preparation is done on the Wafergen Apollo 324 and the Eppendorf epMotion 5075t instruments. Additionally, our experienced technicians will work with client purchased kits for custom applications. The DNA Core works closely with the BRCF Bioinformatics Core to offer a sample to data solution for clients.

**GENOTYPING**
- **Fragment Sizing:** The Core offers our clients the ability to size their DNA fragments using a fluorescence based detection system on our 3730XL Genetic Analyzer. Up to five fluorescent dyes per lane permits multiplexing up to four different types of DNA fragments (for example, amplified microsatellites) plus a fifth dye for an internal size standard to correct for variability between lanes.
- **Affymetrix (now part of ThermoFisher Scientific):** The Core offers a variety of array-based genotyping options and can process samples from DNA to data using any of the following Affymetrix products.
  - **SNP 6.0** — Single-sample cartridges with 1.8 million genetic markers — over 900,000 probes each, for the detection of CNVs and SNPs.
  - **Axiom Biobanking** — Arrays in 96-well format designed for high-throughput, high value genotyping of large sample cohorts to explore the genetics of complex diseases and translational research.
  - **Axiom Precision Medicine Array** — Arrays in 96-well format designed for deeper insights into issues related to common and rare inherited diseases, genetic risk profiling, immune response, pharmacogenomics, clinically actionable variants and other areas associated with precision medicine.
  - **OncoScan** — Single-sample GeneChip cartridges that utilize Molecular Inversion Probe (MIP) technology to assess copy number, LOH and cancer-associated SNPs in FFPE samples.
- **Human Cell Line Validation-CODIS:** The Core offers the AMPFLSTR Identifier Plus Assay for cell line identification, amplifying 15 STR (short tandem repeat) loci and the Amelogenin sex-detection marker and utilizing 5-dye fluorescent dye technology on our 3730XL Genetic Analyzer.
- **Sequenom SNP typing:** This system offers medium-throughput SNP typing on a variety of genomic DNA samples. It is ideal for testing 40 or 80 SNPs in several hundred samples, but we can be flexible about exact numbers.

**GENE EXPRESSION**
- **Affymetrix (now part of ThermoFisher Scientific):** Whether you need human, mouse, rat or any other organism from a long list of available arrays, the Core offers the full line of Affymetrix arrays for gene expression/transcriptome analysis. This includes arrays (e.g., Clariom-D, Clariom-S) with the most up-to-date probes for interrogating all annotated mRNA, splice variants and long intergenic noncoding RNAs (lincRNAs). Additional arrays are also available for microRNAs (miRNAs).
- **Reverse Transcriptase Quantitative PCR (RT-qPCR):**
  - **Qiagen RT2 Profiler** — The Core offers RNA-to-data processing and analysis for any of Qiagen’s 170+ pathway-focused qPCR arrays. Each 384-well plate analyzes 84 genes in up to 4 samples per plate. Customizable plates are also available using Qiagen’s GeneGlobe web-based design tool.
  - **Applied Biosystems OpenArray Panels**—Microscope slide-sized panels have the capacity to run 3,072 qPCR reactions at once. The Core offers service and analytical support for both off-the-shelf (e.g., miRNA, Mouse Inflammation, Human Cancer) and custom designed panels.
The DNA Sequencing Core is growing and changing to adapt to the latest technologies and trends on a daily basis. We are a full-service Core, and we work closely with our investigators to meet their needs and make their research as successful as possible.

— Robert Lyons, Ph.D., Director, DNA Sequencing Core

Cost Estimates and Fees

Costs vary widely depending on services used and analysis. Please contact a member of the staff or visit the website for details: research.med.umich.edu/dnaseq.

EPIGENETICS
- Illumina HumanMethylation Products
- The Core performs methylation profiling using the HumanMethylation27 (27k loci) and HumanMethylation450 (450k loci) products. FFPE samples can be evaluated and restored and methylation profiles generated using the HumanMethylation450 BeadChip.
- The Core performs Illumina® Methylation Profiling for FFPE samples can be elucidated using an Illumina® Infinium® FFPE QC kit, an Infinium® FFPE Restore Kit, & the HumanMethylation450 BeadChip kit.
- EpiTYPER on the Sequenom platform is designed to provide accurate & reproducible methylation mapping. This includes individual methylation ratios for a given CpG & relative methylation ratios between 10%-90%.

OTHER CORE SERVICES
- Agilent Bioanalyzer and TapeStation for sample QC
- NanoDrop and Qubit for nucleic acid quantification
- Real-time PCR instrument rental (ABI 7900HT and StepOne Plus)
- DNA Fragmentation using Covaris Adaptive Focused Acoustics technology
- Genomic DNA isolation from blood and saliva
- Software rental (Sequencer, Mutation Surveyor from the MSRB2 drop-off desk)

The DNA Sequencing Core is growing and changing virtually on a daily basis, so if you don’t see an analysis listed here contact us to inquire. Several new systems have recently arrived, or are arriving soon!

CONNECT WITH US

The main laboratory space for the DNA Sequencing Core is located in Building 14 of the North Campus Research Complex, with over 10,000 sq. ft. of laboratory space. We offer five locations around campus for sample drop-off, and shuttle systems to transport samples to our main site in the NCRC. Those locations are listed below, but please verify the hours of operation via our web site.

**North Campus Research Complex**
Building 14 • Room 122
2800 Plymouth Road
Ann Arbor, MI 48109-2800
Phone: 734-764-8531
boblyons@umich.edu
Open Mon-Fri 8:30 a.m.-12:15 p.m. and 1:15 p.m.-4:30 p.m.

**Life Sciences Institute**
Room 3266 • 210 Washtenaw Ave.
Ann Arbor MI 48109
Open Mon-Fri 1:30 p.m.-3:30 p.m.

**Krause Natural Science Building**
Room 1116 • 830 North University Ave.
Ann Arbor MI 48109-1048
Open Mon-Fri 10:00 a.m.-12:00 p.m.

**Medical Science Research Building II**
Room 2568 • 1150 W. Medical Center Drive
Ann Arbor, MI 48109-0674
Open Mon-Fri 8:30 a.m.-12:15 p.m. and 1:15 p.m.-4:30 p.m

**Brehm Tower**
Room 8054 • 1000 Wall Street
Ann Arbor MI 48105
Open Mon-Fri 4:00 p.m.-5:00 p.m.

About the BRCF

The BRCF, part of the University of Michigan Medical School Office of Research, is a collection of centralized labs and services offering state-of-the-art instruments, resources and expertise to biomedical researchers, investigators and educators.

For more information on the BRCF, visit research.med.umich.edu/brcf