SHARED RESEARCH EQUIPMENT and RESOURCES

MTS Systems - Landmark Servo Hydraulic Material Testing
The custom Landmark Servo Hydraulic material testing machine is able to produce 25kN of force with an actuator travel of 300mm and a maximum velocity of 4m/s. This machine is useful for:

- Uni-axial Dynamic and Quasi-Static Material Testing
- Force control experiments accurate within 0.1N
- Extension control experiments accurate within 0.01mm
- Typically used to gather material properties, failure testing, fatigue testing
- Assortment of compatible fixtures, load cells, and contact/noncontact instruments
- Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

Kuka Robotics - KR300 - R2500 Ultra Industrial 6-Axis Robot
The Kuka KR300 large capacity industrial robot is able to produce ~4kN of static force in six degrees of freedom and move at 2m/s with a reach of 2.5m. This machine is useful for:

- 6DOF Dynamic and Quasi-Static Material Testing and Joint Simulation
- Force control experiments accurate within 2N
- Extension control experiments accurate within 0.1mm
- Typically used to simulate human joints for mechanical properties, failure testing, fatigue testing
- Assortment of compatible fixtures, used in conjunction with NDI optical tracking system
- Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

Simbex - Head Impact Telemetry (HITS) Sideline Response System
The HIT System is a real-time head kinematic measurement tool. It is primarily used to measure the linear and rotational acceleration of sensors mounted within helmets of sports participants. The system contains a base unit with computer and wireless transmitter to collect acceleration data wirelessly from sensor units mounted in football helmets. This machine is useful for:

- Real-time 6DOF acceleration data acquisition and processing
- Typically used to measure concussion risk in young athletes in conjunction with other clinical tools Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

Philips - BV Libra C-arm Fluoroscope
Clinical quality C-arm fluoroscope with a 6" image intensifier. This machine is useful for:

- orthopedic imaging
- Typically used to measure quality of surgical repairs and relative motion of internal components used in biomechanical studies Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

Zcorp - Z450 3D Printing Machine
The Z450 is an all in one color powder additive manufacturing system and depowdering station. It has a build chamber of 8"x10"x8" with a layer thickness of 0.004" and XY resolution of 0.002". This machine is useful for:

- Display quality color 3D prototypes
- Medical models and pre-surgical planning models
- Typically used to create surgical planning models of skulls for plastic surgery
- ability to cure models in cyanoacrylate and low viscosity epoxy
- Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

Form Labs - FormOne 3D Printing Machine
The FormOne is a desktop stereo lithography (SLA) 3D printing machine. It has a build chamber of 4.9"x4.9"x6.5" with a layer thickness of 0.001". This machine is useful for:

- Close to Injection molded quality, opaque and translucent, high accuracy prototypes
- Medical models and medical device prototype printing
- Typically used to create small clear highly accurate parts for medical devices
- Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

Makerbot - Replicator Gen5 3D Printing Machine
The Replicator gen5 is a desktop fused deposition modeling (FDM) 3D printing machine. It has a build chamber of 9.9"x7.8"x5.9" with a layer thickness of 0.004" using polylactic acid plastic (PLA). This machine is useful for:

- Large, functional plastic, medium accuracy prototypes
- Medical models and medical device prototype printing
- Typically used to create larger parts for medical devices and experiment fixturing parts
- Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineer

MSC - Ventrax CNC Knee Mill
Fagor 8055i controlled 3-axis CNC, 3HP knee mill. This machine is useful for:

- Milling, Drilling, Tapping
- prototype, tooling, and fixturing manufacture
- CNC Conversational Programming and G-code interpretation
- Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

MSC - Ventrax Engine and Tool room Lathe

Manual bench lathe, 2HP geared speed control between 70RPM and 1500RPM. . This machine is useful for:

- Facing, Drilling, Tapping
- prototype, tooling, and fixturing manufacture
- Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

MSC - Ventrax Variable Speed Floor Drill Press
Manual Drill Press, 2HP with variable speed between 170RPM and 2000RPM
This machine is useful for:

- Drilling
- prototype, tooling, and fixturing manufacture
- Located at Biotech Place

Contact Person: Joel Stitzel (jstitzel@wakehealth.edu), Center for Injury Biomechanics
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

Asylum MFP 3D Bio Atomic Force Microscope
An atomic force microscope that can be operated independently or on top of an inverted optical microscope
This machine is useful for:

- High-resolution imaging of molecules, cells, material surfaces, etc.
- Direct force spectroscopy and nanomanipulation
- Simultaneous optical microscopy (bright field and fluorescence) and atomic force microscope imaging/manipulation/spectroscopy
- Located at Biotech Place

Contact Person: Adam Hall (arhall@wakehealth.edu), Biomedical Engineering
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

Harrick Plasma Expanded Plasma Cleaner
A self-contained plasma (air and oxygen) generation tool with adjustable power up to 30 W
This machine is useful for:

- Cleaning samples of organic contaminants
- Sterilization
- Forming free radicals for surface reactions
- Located at Biotech Place

Contact Person: Adam Hall (arhall@wakehealth.edu), Biomedical Engineering
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

TEG® 5000 Thrombelastograph® Hemostasis Analyzer system, Haemonetics Corporation
The TEG Hemostasis Analyzer system is a diagnostic instrument that provides comprehensive whole blood hemostasis testing that can help assess bleeding and thrombotic risks (clinically), and also monitor antithrombotic therapies. This machine is able to quantify rate of clot formation, clot strength, and rate of clot degradation (due to lysis) in whole blood. It also has the capability to do platelet mapping and some platelet function tests.
This machine is useful for:

- ☐ Characterizing clot strength from whole blood samples (minimum 340 uL needed)
- ☐ Determining the contribution of fibrinogen and platelets to clot strength

☐ Can be used in both clinical and research settings
- Located at Biotech Place

Contact Person: Ellie Rahbar (erahbar@wakehealth.edu), Biomedical Engineering
Beverly Wright (bwright@wakehealth.edu) 716-6890 Biomedical Engineering

Life Technologies ABI 3730XL DNA Sequencer
The ABI 3730XL is a capillary based DNA sequencer that has the ability to analyze 96 samples per run with a continuous run capacity of 15 96 well plate per loading. This DNA sequencer is useful for:
- Validation of DNA clones
- Comparative DNA sequencing
- DNA re-sequencing
- SNP validation and discovery
- Methylation based DNA sequencing of bi-sulfite treated DNA

Contact person: Dr. Greg Hawkins (ghawkins@wakehealth.edu)
Center for Genomics and Personalized Medicine

Sequenom MassARRAY SNP Genotyping System
The Sequenom Mass ARRAY SNP Genotyping system is a flexible platform used for genotyping applications. The system if fully automated and include the Assay Designer 4.0 is used for primer design and the MassArray-Typer 4.0 software to make genotype calls. The MassARRAY System offers the following features, which are essential to clinical genetics research:
- Capacity to analyze multiple classes of genetic markers.
- Ability to quickly create and modify customized assay panels.
- Flexible sample throughput, from few to thousands.
- High quality data with low operating costs.

Contact person: Dr. Lilly Zheng (szheng@wakehealth.edu), Center for Genomics and Personalized Medicine

Illumina HiScan and BeadStation 500GX System
The Illumina HiScan is used for high through-put genetic analysis platform. The Illumina HiScan utilizes predesigned or custom designed chips to perform whole genome screens. The capabilities are:
- Ability to perform whole genome screens for SNPs (arrays from ~700,000 SNPs to >4 million SNPs)
- Whole genome gene expression
- Whole genome methylation analysis

Contact person: Dr. Lilly Zheng (szheng@wakehealth.edu), Center for Genomics and Personalized Medicine

Life Technologies SOLiD 5500 XL W Next Generation DNA Sequencer
The SOLiD 5500XL W is a massive Next Generation DNA sequencer. This provides >300 Gb of sequencing data output in a single run providing >50 million reads per sample. This platform is suitable for the analysis of multiple DNA samples. Applications include:
- Whole genome sequencing
- DNA re-sequencing using custom capture arrays
- Exome sequencing
- Chromatin Immunoprecipitation DNA sequencing (ChIPseq)
- DNA methylation analysis (Methylation capture)

- RNA sequencing (RNAseq)
- Metagenomics

Contact person: Dr. Greg Hawkins (ghawkins@wakehealth.edu) Center for Genomics and Personalized Medicine

Covaris DNA Focused Ultrasonicator for DNA Shearing
A hydrosonic DNA shearer useful for:
- Shearing DNA for ChIPseq
- Preparation of next generation DNA sequencing libraries

Contact person: Dr. Greg Hawkins (ghawkins@wakehealth.edu) Center for Genomics and Personalized Medicine

PyroMark Q96 MD Pyrosequencer
The PyroMark Q96 MD Pyrosequencer is a highly sensitive and quantitative DNA sequencing platform that utilizes DNA sequencing by synthesis chemistry called pyrosequencing. This platform can analyze 96 samples per run and is useful for:
- Identification and quantification of DNA methylation
- Measuring allelic specific gene expression
- DNA polymorphism genotyping
- Quantifying SNP allele frequency in pooled samples
- Sequencing short PCR products that are difficult to sequence by Sanger sequencing methods

Contact person: Dr. Greg Hawkins (ghawkins@wakehealth.edu) Center for Genomics and Personalized Medicine

AutoPure LS DNA Isolation Robot
The AutoPure DNA robot is a high throughput DNA purification platform suitable for isolating DNA from large volumes of whole blood (Gentra Systems, Inc.),

Contact person: Dr. Lilly Zheng (szheng@wakehealth.edu), Center for Genomics and Personalized Medicine

Life Technologies ABI7500 and ViiA 7 Real-Time PCR System
These Real-Time PCR systems are useful for:
- Quantification of RNA and DNA
- Gene expression using Real-Time PCR
- Genotyping using TaqMan assays (custom or pre-designed)

Contact person ABI 7500: Dr. Lilly Zheng (szheng@wakehealth.edu), Center for Genomics and Personalized Medicine

Contact person ViiA 7: Dr. Nichole Allred (nallred@wakehealth.edu), Center for Genomics and Personalized Medicine

Agilent 6890 Gas Liquid Chromatographs with Parker Balston Hydrogen Generators
These two GC's are used for the rapid and sensitive detection and identification of major sterol classes and over 37 different fatty acids.
- Hydrogen generated flame-ionizing detectors
- Auto-injector for uninterrupted workflow
- Data can be expressed as percent distribution or absolute mass

Contact Person: Dr. Larry Rudel (lrudel@wakehealth.edu), Department of Pathology/Lipid Sciences, Lipids Lipoproteins and Atherosclerosis Analyses Core

Hitachi LaChrom Elite Chromatography Systems

These two HPLC's are used in detection and identification of plasma lipoproteins by gel filtration chromatography.

- L2220 Autosampler
- Peltier Cooled
- On-line detection of lipoproteins by UV/VIS for Protein, Cholesterol or Triglyceride
- Fraction-collection compatible for preparative analysis.
- Chromatography in conjunction with cholesterol concentration determination enables the determination of cholesterol mass in the lipoprotein species.

Contact Person: Dr. Larry Rudel (lrudel@wakehealth.edu), Department of Internal Medicine/Section on Molecular Medicine, Lipids Lipoproteins and Atherosclerosis Analyses Core

Chrome-Perfect Spirit Software for Online Chromatogram Analysis

Software for the collection and analysis of data from HPLC's and GC's

- Capable of collecting data from 4 machines simultaneously.
- Flexible software that is user-friendly

Contact Person: Dr. Larry Rudel (lrudel@wakehealth.edu), Department of Internal Medicine/Section on Molecular Medicine, Lipids Lipoproteins and Atherosclerosis Analyses Core

Beckman Coulter Optima Max-E Ultracentrifuge with TLA-55, TLA 120.1 and TLA 120.2 Rotors

For the preparative separation of major lipoprotein classes by KBr density centrifugation.

Contact Person: Dr. Larry Rudel (lrudel@wakehealth.edu), Department of Internal Medicine/Section on Molecular Medicine, Lipids Lipoproteins and Atherosclerosis Analyses Core

Wyatt Dawn Heleos-II and Optilab Rex Light-Scattering Detectors

These devices in combination with HPLC provides an absolute method of molecular weight determination for lipoprotein particles

Contact Person: Dr. Larry Rudel (lrudel@wakehealth.edu), Department of Internal Medicine/Section on Molecular Medicine, Lipids Lipoproteins and Atherosclerosis Analyses Core

Wild M650 Double headed Surgical Microscope with Light Source

The Wild double headed surgical microscope is used for detailed mouse surgery requiring 2 people to perform the surgery.

- This microscope is located outside the barrier facility of the Dean Building so that mice cannot be returned to regular barrier housing post-procedure.

Contact Person: Dr. Larry Rudel (lrudel@wakehealth.edu), Department of Internal Medicine/Section on Molecular Medicine, Lipids Lipoproteins and Atherosclerosis Analyses Core

Instruments used to Facilitate Metabolic Experiments

- Beckman T2-21 High Speed Centrifuge with JA21, JA20, JA18.1 and JA10 rotors
- ISCO High Pressure Liquid Chromatographs with online cholesterol monitoring
- Applied Biosystems 7500 Genetic PCR System
- Beckman Du640 Spectrophotometer
- Beckman Gamma 4000 Gamma Counter
- Beckman L5-50 and L7-70 Ultracentrifuges with 50.2Ti, 70.1Ti (3), SW27, SW40 (2), SW#55Ri,
- Vti-50 (2) and Vti-65 rotors
- Beckman LS-7500 Liquid Scintillation Counter
- Digiflex Automatic Pipettes
- Mettler Toledo XS104 Analytical Balance
- Revco Ultralow Freezers 21 cu ft.
- Tecan GENios Fluorescence Microplate Reader

Contact Person: Dr. Larry Rudel (lrudel@wakehealth.edu), Department of Internal Medicine/Section on Molecular Medicine, Lipids Lipoproteins and Atherosclerosis Analyses Core

Eppendorf 5702 refrigerated centrifuge

- For processing blood specimens

Contact Person: Adele Clark, PA-C, Dept of Dermatology, adclark@wakehealth.edu

Thermo Scientific -80 freezer

- For storage of frozen specimen

Contact Person: Adele Clark, PA-C, Dept of Dermatology, adclark@wakehealth.edu

Kewaunee Dynamic Barrier Air Cure Hood

- To limit exposure to hazardous or toxic fumes, dust or vapors

Contact Person: Adele Clark, PA-C, Dept of Dermatology, adclark@wakehealth.edu

PeriMed PIM II laser Doppler perfusion Imager

- For measuring blood flow in the skin

Contact Person: Adele Clark, PA-C, Dept of Dermatology, adclark@wakehealth.edu

PTI DELTA RAM V Illluminator for Photon Tech Imaging System

The PTI system is currently used for intracellular calcium imaging in cultured cells. (currently only for Fura-2-AM)

- Capable to measure fluorescent intensity (different filters may be required)
- Capable to test effects of drugs on intracellular calcium level in live cells using a perfusion system.

Contact person: Dr. Ken Hayashida (khayashi@wakehealth.edu, Pain Mechanisms Lab. Anesthesiology.

Waters Q-Tof Tandem Mass Spectrometer

The Q-Tof is equipped with CapLC, cooled autosampler and Advion Nanomate source. The instrumentation conducts electrospray mass spectrometry in the positive and negative ion modes and will perform collision-induced dissociation for structure analysis. This system is used for:

- Analysis of intact protein
- Analysis of proteolytic digests of proteins
- Peptide sequencing
- Analysis of mass with 3 ppm accuracy
- Detection sensitivity in femtomole range
- Location: Dean/A1 room 340

Contact persons: Dr. Cristina Furdui, Core Director, Proteomics and Metabolomics (Mass Spec Core) (cfurdui@wakehealth.edu) 716-2697
Mr. Brian Fulp, Technician CCCWFU, (bfulp@wakehealth.edu) 716-2345

ThermoElectron TSQ Quantum Discovery Max Triple Quadrupole Mass Spectrometer

The Discovery Max is equipped with an Agilent HPLC/autosampler and a Symbosis LC/sample prep station with cooled autosampler. The instrumentation conducts electrospray mass spectrometry in the positive and negative ion modes and will perform collision-induced dissociation for structure analysis. The Facility performs lipid and metabolite isolation as required for analysis. This system is used for:

- SRM analysis of lipids and other metabolites for quantitation with picomole sensitivity
- Common neutral loss, precursor and parent ion analysis to identify common features for structure analysis
- SRM analysis of peptides for quantitation and identification
- Analysis of mass with unit mass resolution
- Input is by liquid infusion or the effluent from an LC column
- Location: Hanes 2009

Contact persons: Dr. Cristina Furdui, Core Director, Proteomics and Metabolomics (Mass Spec Core) (cfurdui@wakehealth.edu) 716-2697
Mr. Brian Fulp, Technician CCCWFU, (bfulp@wakehealth.edu) 716-2345

ThermoElectron TSQ Quantum XLS Triple Quadrupole Mass Spectrometer

The XLS is equipped with a Trace gas chromatograph and Triplus cooled autosampler. The instrumentation conducts electron impact and chemical ionization mass spectrometry in the positive and negative ion modes and will perform collision-induced dissociation for structure analysis. The Facility performs lipid and metabolite isolation as required for analysis. This system is used for:

- SRM analysis of volatile lipids and other metabolites for quantitation with picomole-femtomole sensitivity
- Common neutral loss, precursor and parent ion analysis to identify common features for structure analysis
- Analysis of mass with unit mass resolution
- Location: Hanes 2009

Contact persons: Dr. Cristina Furdui, Core Director, Proteomics and Metabolomics (Mass Spec Core) (cfurdui@wakehealth.edu) 716-2697
Mr. Brian Fulp, Technician CCCWFU, (bfulp@wakehealth.edu) 716-2345

Affymetrix Microarray System

Affymetrix microarrays are high-content state-of-the-art genetic screening platforms. The system is flexible (gene focused or comprehensive, multi-species platforms) and customizable with applications including:

- Expression profiling – mRNA/microRNA/lncRNA profiling, tumor profiling, time course assays
- Copy number variation (CNV) detection – tumor profiling, genetic association

- SNP analysis – genome-wide association analysis
- ChIP-chip – transcription factor binding site identification

Contact persons: Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist
Dr. Jeff Chou (jchou@wakehealth.edu), Bioinformatician

Microarray Bioinformatics & Data Analysis

- Data processing and quality control
- Data normalization
- Differential expression analysis
- Mutational analysis
- Clinical-genomic correlation analysis
- Pathway enrichment analysis
- Data visualization
- Data mining and custom informatics

Contact persons: Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist
Dr. Jeff Chou (jchou@wakehealth.edu), Bioinformatician

(2) Agilent Bioanalyzer 2100

- 3 Electrode cartridges for separately processing DNA, RNA and small pico quantities of RNA
- Determination of integrity, purity and quantity of nucleic acids, namely RNA
- Quantification and sizing of protein and DNA

Contact persons: Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist

BioMetra TGradient PCR-with programmable heated lid

- Reverse transcription
- IVT labeling of biotin based cRNA
- RNA fragmentation
- Hybridization preparations
- Denaturing RNA for bioanalysis

Contact persons: Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist

GeneAmp PCR System 9700

- Reverse transcription
- IVT labeling of biotin based cRNA
- RNA fragmentation
- Hybridization preparations
- Denaturing RNA for bioanalysis

Contact persons: Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist

Perkin Elmer Cetus-DNA Thermal Cycler

- PCR
- Denaturing nucleic acids for bioanalysis
- Precision reactions and incubations

Contact persons: Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist

BioPhotometer

- RNA concentration determination
- 260/280 and 260/230 ratio analysis to determine RNA purity

Contact persons: Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist

BioRad iCycler iQ Multiplex Real-Time PCR

- Gene expression analysis by Real-Time PCR
- Quantification of RNA and DNA

Contact persons: Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist

Illumina NextSeq 500-NGS

- DNAseq
  - Exome Sequencing – identification and validation of genetic variants (mutations, SNPs, insertion-deletions (InDels)
  - Whole genome sequencing – mutation detection, tumor profiling, denovo genome sequencing
  - Methylation sequencing – whole genome bisulfite sequencing, methylation enrichment (methylation binding protein)
  - ChIPseq – transcription factor binding site identification

- RNAseq – gene expression profiling, gene fusion analysis, allele specific expression, splice variant detection, microRNA (miRNA) detection, long non-coding RNA (lncRNA) detection

Contact persons: Dr. Greg Hawkins (ghawkins@wakehealth.edu), Co-Director Cancer Genomics Core
Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist
Dr. Jeff Chou (jchou@wakehealth.edu), Bioinformatician

Illumina MiSeq- NGS

- DNAseq
  Microbiome
  ChIPseq
  Amplicon
  Screening panels

Contact persons: Dr. Greg Hawkins (ghawkins@wakehealth.edu), Co-Director Cancer Genomics Core
Dr. Lance Miller (ldmiller@wakehealth.edu), Co-Director Cancer Genomics Core
Lou Craddock (lcraddoc@wakehealth.edu), Manager/Microarray Specialist
Dr. Jeff Chou (jchou@wakehealth.edu), Bioinformatician

Typhoon Trio
The goal of the Analytical Imaging Facility is to provide equipment for the acquisition and analysis of images from radioactive, fluorescent, or chemiluminescent samples such as agarose and polyacrylamide gels, membranes, microplates, and microarrays.

- The Typhoon Imager allows for indirect phosphor imaging of ^{3}H, ^{14}C, ^{125}I, ^{32}P, ^{33}P, ^{35}S or other radioactive signals from gels or membranes.
- Users provide their own phosphor storage screens for these applications; Image Erasers are available in the facility. .
- The Typhoon Trio has three excitation lasers (488/532/633) for direct excitation of red-, green-, and blue-excited fluorophores as well as chemifluorescent samples. With six emission filters, this allows for scanning of up to four fluorescent dyes in one sample.

Contact Person: Dr. Linda Metheny-Barlow (336-713-7636)

Amersham Imager-600 RGB
The goal of the Analytical Imaging Facility is to provide equipment for the acquisition and analysis of images from radioactive, fluorescent, or chemiluminescent samples such as agarose and polyacrylamide gels, membranes, microplates, and microarrays.

- CCD camera-based multi-label imager capable of capturing and analyzing images from DNA gels, chemiluminescent and fluorescent Western blots (red, blue, and green fluorophores), and Coomassie or silver-stained protein gels

Contact Person: Dr. Linda Metheny-Barlow (336-713-7636)

Software ImageQuant TL8.1 and ImageQuant 5.2 software
The goal of the Analytical Imaging Facility is to provide equipment for the acquisition and analysis of images from radioactive, fluorescent, or chemiluminescent samples such as agarose and polyacrylamide gels, membranes, microplates, and microarrays.

- available on computers in the facility for the analysis of 8 to 16 bit grayscale TIFF, .gel, or .ds files captured by these or other imagers.

Contact Person: Dr. Linda Metheny-Barlow (336-713-7636)

High Performance Liquid Chromatography
- Analytical HPLC of biomolecules [**Columns: 2.1mm, 3.9mm, 4.6mm**
- **C4, C18, Size Exclusion (TSK) 2000,3000,4000**
- **Automated Temperature control Column Heater**
- **Automated Auto sampler 2-2000ul injections with temperature control from 4 degrees to 35 centigrade**

- **Detection: variable wavelength 190nm-700nm programmable channels along with multiple wavelengths at a time.**

Protein purification is performed using a Waters 650e HPLC & LC150 system. Flow rates from 0.1mL/min to 100mL/min. Columns: Ion exchange [DEAE, MonoQ, MonoS, Poros R1/H; Size Exclusion chromatography columns Superdex 200, & Sephacryl S-300HR. Prep columns: Porasil [40x100]; RP C8 [10 x 100] & RP C4 [25x100, 40x100];C18 [8x100, 25x100, 40x100, 40x200mm] Detection via UV-Vis dual wavelength detector Investigators can use this system to purify multi milligram quantities of biologically active proteins.

Contact person: Dr. Mark Lively, Director, Bioanalytical Resource Laboratory mlively@wakehealth.edu
Mark Morris, Technician (jmmorris@wakehealth.edu) 716-2581

Peptide and protein identification. The Bruker Autoflex MALDI-TOF is a time-of-flight mass spectrometer with high sensitivity and mass accuracy. The instrument is used for identification of unknown proteins by peptide mass fingerprint analysis, identification of post-translational modified peptides, and accurate mass measurement of intact proteins up to 100 kDa.

Contact person: Dr. Mark Lively, Director, Bioanalytical Resource Laboratory mlively@wakehealth.edu
Mark Morris, Technician (jmmorris@wakehealth.edu) 716-2581

Protein Sequencing - Applied Biosystems Model 492HT Protein/Peptide Sequencer

The chromatographic data from sequence analysis are interpreted by the technician and the laboratory director, and then the best interpretable amino acid sequence is reported to the investigator. Extended amino acid sequences (>10 residues) are searched against the latest available version of the protein sequence databases (including SwissProt and PIR) to identify similarities with known proteins.

- Sequence analysis of purified polypeptides
- Equipped with an on-line PTH-amino acid analyzer and data analysis computer
- Between 1.0 and 100 pmol of purified peptide is required for sequence analysis
- Location: Biotech Place

Contact person: Dr. Mark Lively, Director, Bioanalytical Resource Laboratory mlively@wakehealth.edu
Mark Morris, Technician (jmmorris@wakehealth.edu) 716-2581

Amino Acid Composition Analysis – HPLC

- Quantitative amino acid composition analyses of hydrolyzed peptides are performed by HPLC following hydrolysis and derivatization with phenylisothiocyanate. The method is used to detect and quantify the common amino acids obtained by acid hydrolysis with a limit of quantitation of approximately 25 pmol. Tryptophan, asparagines, cysteine, and glutamine are not generally determined.
- Location: Biotech Place

Contact person: Dr. Mark Lively, Director, Bioanalytical Resource Laboratory mlively@wakehealth.edu
Mark Morris, Technician (jmmorris@wakehealth.edu) 716-2581

- By special request, cysteine can be determined as cysteic acid following performic acid oxidation. The Protein laboratory performs the hydrolysis, derivatization with phenylisothiocyanate, and analysis of the samples by HPLC. The results are reported as moles of each amino acid present in the sample after hydrolysis.
- Location: Biotech Place

Contact person: Dr. Mark Lively, Director, Bioanalytical Resource Laboratory mlively@wakehealth.edu
Mark Morris, Technician (jmmorris@wakehealth.edu) 716-2581

Peptide Mapping – HPLC

- We can do a proteolytic digest of your protein submitted from a SDS-PAGE gel piece or blotted to PVDF membrane. The resulting peptides are separated by HPLC and subsequent amino acid sequencing and/or mass spectrometry analysis of the peaks will be used to determine the internal amino acid sequence of your protein.
- Location: Biotech Place

Contact person: Dr. Mark Lively, Director, Bioanalytical Resource Laboratory mlively@wakehealth.edu
Mark Morris, Technician (jmmorris@wakehealth.edu) 716-2581

Other Services of the Bioanalytical Resource Laboratory

- Open column chromatography
- Computer analysis of both experimental and theoretical data
- Location: Biotech Place

Contact person: Dr. Mark Lively, Director, Bioanalytical Resource Laboratory mlively@wakehealth.edu
Mark Morris, Technician (jmmorris@wakehealth.edu) 716-2581

Hypoxia Chamber

- Equipment allows modulation of oxygen levels for cell culture.
- Details are on our website, listed below

Contact person: Dr. Purnima Dubey, Director, Cell and Viral Vector Core Lab pdubey@wakehealth.edu

IVIS Lumina

- Equipment permits non-invasive imaging of bioluminescent and fluorescent signals in mice and rats.
- It is most useful for a) longitudinal imaging of tumor growth and response to therapy, or b) tracking the movement, development and localization of various cell populations (immune cells, stromal cells, blood vessels, etc.).
- Our website does not contain information on the IVIS, and I will work on updating it.

Contact person: Dr. Purnima Dubey, Director, Cell and Viral Vector Core Lab pdubey@wakehealth.edu

FEI Tecnai BioTwin Transmission Electron Microscope (120 keV)

This microscope is used to image cellular ultrastructure, viruses, bacteria, macomolecules and nanoparticles. The Cellular Imaging Shared Resource is equipped to carry out all phases of sample preparation for electron microscopy with a staff that includes a technical engineer/manager and two technologists

- 0.34 nm resolution
- 2 Vu AMT camera capable of 12 mega pixel images
- Software for measurements and stitching of images
- Reicher-Jung Ultracut E microtomes for producing thin sections suitable for viewing with the transmission electron microscope

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Olympus FV1200 SPECTRAL Laser scanning Confocal Microscope (Olympus IX83 inverted platform)

This microscope is designed to perform; slides, tissues and live cell image studies. It possesses HSD high-sensitivity detectors (GaAsPs) for ultra-low signal detection and super fast acquisition times. 6 laser lines for multicolor, multispectral analysis. The attached fully heated and gas perfused Tokai Hit live cell imaging system facilitates multiwell, multi day timelapse imaging

- 4-6 color imaging with multiline argon laser (457,488,515nm) , an 405nm,440nm, 559nm,635nm laser diode
- 5 channel detection (2-GaAsPs)
- Multispectral imaging
- Intensity measurements
- Multidiminsional time lapse capability
- Deep 3D imaging and 3D projections
- Live cell imaging with Tokai Hit live cell imaging chamber
- HSD faciltate ultra-low signal dections, ultra fast signal acquisition; Ca^{+2}, Redox, etc
- Image processing and analysis software included
- The Cellular Imaging Shared Resource staff trains and assists all microscope users

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Zeiss LSM 510 Laser Scanning Confocal Microscope on a Zeiss Axiovert 100 M Inverted Platform

This microscope is used to produce two and three-dimensional images of cells, tissues and biomaterials which are labelled with up to three different fluorophores.

- Three color imaging with an argon-ion laser(488nm) , a HeNe 543 and a HeNe 633 laser
- Intensity measurements
- Time series capability
- 3D projections
- Image processing and analysis software included
- The Cellular Imaging Shared Resource staff trains and assists all microscope users

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Zeiss Axioplan 2 Fluorescence Microscope

This microscope is used to produce brightfield, phase and epi- fluorescent images of tissue sections and cultured cells. The Cellular Imaging Shared Resource staff trains and assists all microscope users.

- Upright format available for imaging
- Capable of imaging uv, fluorescein and rhodamine labelled cells and tissues
- Captures images using polarized light
- AttoArc mercury lamp controller
- Zeiss AxioCam camera capable of 14 bit 3900 X 3090 scanned color images

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Olympus IX-70 Fluorescence Microscope

This microscope is used to produce brightfield, phase and epi-fluorescent images of tissue sections and cultured cells either fixed or alive. The Cellular Imaging Shared Resource staff trains and assists all microscope users.

- Inverted format available for imaging
- Capable of imaging uv, fluorescein, rhodamine and far red labelled cells and tissues
- Coy Laboratory Products air recirculator and heater for long term observations of cells
- Eppendorf Micromanipulator InjectMan for direct injection into the nucleus and/or cytoplasm of cultured cells
- Sutter P-30 Micropipette Puller used to make injection pipettes for the InjectMan
- Retiga 6000, 14-bit Q capture camera and Cell Sens Dimensions 1.9 software

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Arcturus PixCell II Laser Microdissection System

This microscope is used to selectively extract individual cells from a blood smear, culture or sections(paraffin/frozen) for the purpose of protein and dna/ rna analysis. The Cellular Imaging Shared Resource staff trains and assists all microscope users.

- Inverted format for imaging
- Capable of imaging brightfield, uv, fluorescein, and rhodamine labelled cells
- Microdissection spotsize of 7.5 µm for individual cell extraction
- Microdissection spotsizes of 15 and 30 µm for multiple cell extractions
- Imaging software for the documentation of tissue and cells before and after microdissection

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Hacker-Bright Instrument Cryostat
This microtome is used to produce frozen sections of cells, tissues and biomaterials that can be viewed with any microscope equipped with phase optics or epi-fluorescence. The Cellular Imaging Shared Resource staff trains and assists all users of this equipment.

- Motorized for convenience
- Incorporates Instrumedics CryoJane process to firmly adhere sections to a microscope slide

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Shandon Cytospin 3 Cell Preparation System
This instrument is used to deposit a monolayer of cells in a defined area on glass slides using centrifugal force. The Cellular Imaging Shared Resource staff trains and assists all users of this equipment.

- Programmable
- Has a capacity of 12 slides
- Completely contained for maximum protection when using hazardous specimens

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Denton Vacuum DCP-1 Critical Point Drying Apparatus
This instrument is used to dry and minimize shrinkage artefact of biological specimens to be viewed in any scanning electron microscope. The Cellular Imaging Shared Resource staff provides this service.

- Uses liquid carbon dioxide as the transitional fluid
- Capacity for multiple sample processing
- Procedure requires approximately 1.5 hours to complete

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Denton Vacuum Desk V Sputter Coating Apparatus
This instrument is used to deposit a metal coating on dry samples to be viewed in any scanning electron microscope. The Cellular Imaging Shared Resource staff provides this service.

- Uses an "etch" and "sputter" cycle to optimize coating
- Uses a gold and palladium cathode for 50- 200Å deposition
- Procedure requires 30 minutes

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Becton-Dickinson FACS Aria - Flow Cytometer Cell Sorters
Becton-Dickinson FACS Aria The BD FACS Aria is a cell sorter with three lasers (405nm, 488nm and 635nm) and able to detect forward scatter, side scatter and nine fluorescence parameters. It has three sorting nozzles (70, 100 and 130 micron) to accommodate a wide range of cell types. The cell sorter can sort both fixed and living cells. For sorting of living cells from potentially biohazardous sources (e.g. transfected cells, infected cells, fresh tissue from human and non-human primates, etc.). The BD FACS Aria is mounted within a BioProtect Hood to prevent hazardous aerosols from escaping from the sorter into the room. The hood and cell sorter are maintained in their own room separate from the flow cytometer analyzers. **Flow cytometer cell sorter is located in Hanes 4th Floor, Rm 4063*

Contact Persons: Dr. Martha Alexander-Miller (marthaam@wakehealth.edu)
Dr. James Wood (jawood@wakeheath.edu) Comprehensive Cancer Center

Becton-Dickinson FACS Canto II - Flow Cytometer Analyzer
The BD FACS Canto II is an analyzer with three lasers (405nm, 488nm and 635nm) and able to detect forward scatter, side scatter and eight fluorescence parameters. *Flow cytometer analyzer is located in Biotech Place, room 2E-001*

Flow Cytometry is used to provide rapid single cell analysis, affords researchers the ability to identify specific populations of cells. Populations can be isolated under sterile conditions if desired. Instruments in the Flow Cytometry Core Facility are capable of multi-parameter analysis or sorting.
Most any type of particle, both cellular and non-cellular, can be analyzed by the flow cytometers.

- Measurement of DNA and RNA content for cell cycle analysis, chromosome analysis, cell cycle specific nuclear and cytoplasmic proteins, cytokine production, proliferation, protein phosphorylation, apoptosis markers, substituted deoxyuridine incorporation, stem cell side-populations detection, expression of fluorescent proteins (GFP, DsRed, etc.), Ca++ flux detection, reactive oxygen species, cell surface markers using labeled antibodies or substrates, cell viability, intracellular ion concentration or pH, and membrane potential.
- Cell lysates and serum are readily analyzed with bead based substrate immunoassays.
- Bacteria can be analyzed based on AT/GC ratios, DNA and RNA content, and membrane potential.
- Yeasts, protozoans, parasites and other small multicellular organisms can be analyzed as long as they are small enough and can be aligned to pass through the flow cell.

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Becton-Dickinson FACS Calibur - Flow Cytometer Analyzer
The BD FACS Calibur is an analyzer with two lasers (488nm and 635nm) and able to detect forward scatter, side scatter and four fluorescence parameters. *Flow cytometer analyzer is located in Biotech Place, room 2E-001*

Flow Cytometry is used to provide rapid single cell analysis, affords researchers the ability to identify specific populations of cells. Populations can be isolated under sterile conditions if desired. Instruments in the Flow Cytometry Core Facility are capable of multi-parameter analysis or sorting.
Most any type of particle, both cellular and non-cellular, can be analyzed by the flow cytometers.

- Measurement of DNA and RNA content for cell cycle analysis, chromosome analysis, cell cycle specific nuclear and cytoplasmic proteins, cytokine production, proliferation, protein phosphorylation, apoptosis markers, substituted deoxyuridine incorporation, stem cell side-populations detection, expression of fluorescent proteins (GFP, DsRed, etc.), Ca++ flux detection, reactive oxygen species, cell surface markers using labeled antibodies or substrates, cell viability, intracellular ion concentration or pH, and membrane potential.

- Cell lysates and serum are readily analyzed with bead based substrate immunoassays.
- Bacteria can be analyzed based on AT/GC ratios, DNA and RNA content, and membrane potential.
- Yeasts, protozoans, parasites and other small multicellular organisms can be analyzed as long as they are small enough and can be aligned to pass through the flow cell.

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The BD Accuri C6 - Flow Cytometer Analyzer
The BD Accuri C6 is an analyzer with two lasers (488nm and 640nm) and able to detect forward scatter, side scatter and four fluorescence parameters.**Flow cytometer analyzer is located in Hanes 4th Floor, Rm 4063*

Flow Cytometry is used to provide rapid single cell analysis, affords researchers the ability to identify specific populations of cells. Populations can be isolated under sterile conditions if desired. Instruments in the Flow Cytometry Core Facility are capable of multi-parameter analysis or sorting.
Most any type of particle, both cellular and non-cellular, can be analyzed by the flow cytometers.

- Measurement of DNA and RNA content for cell cycle analysis, chromosome analysis, cell cycle specific nuclear and cytoplasmic proteins, cytokine production, proliferation, protein phosphorylation, apoptosis markers, substituted deoxyuridine incorporation, stem cell side-populations detection, expression of fluorescent proteins (GFP, DsRed, etc.), Ca++ flux detection, reactive oxygen species, cell surface markers using labeled antibodies or substrates, cell viability, intracellular ion concentration or pH, and membrane potential.
- Cell lysates and serum are readily analyzed with bead based substrate immunoassays.
- Bacteria can be analyzed based on AT/GC ratios, DNA and RNA content, and membrane potential.
- Yeasts, protozoans, parasites and other small multicellular organisms can be analyzed as long as they are small enough and can be aligned to pass through the flow cell.

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Analysis Computers and Flow Cytometry Analysis Software
Each flow cytometer analyzer and cell sorter has flow Cytometry analysis software on its respective workstation. Additionally, there is also a separate analysis computer at the Biotech Place for offline analysis of flow cytometer data with CellQuest and FlowJo analysis software. The shared resource through the Cancer Biology Department has a two-seat license of FCS Express on the shared drive of the Cancer Center. Also, in the Hanes 4th Floor Room 4063, co-located with the BD Accuri C6 is a computer with DNA analysis programs, ModFit and Multicycle, installed.

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Crystallography and Computational Biosciences
The X-ray facility houses a Rigaku Micromax 007 X-ray source with dual VariMax-HF Confocal Optic Systems coupled to Saturn92 CCD and RAXIS4+ detectors. The systems are capable of cryogenic cooling for X-ray data collection. The macromolecular crystallization laboratory located next door is equipped with a Gryphon 96 well crystallization robot (Art Robins Instruments), and all the necessary ancillary equipment, such as, microscopes and crystallization cabinets. The facility was upgraded in 2012 with funds from the North Carolina Center for Biotechnology, as part of its move to Wake Forest Biotech Place.

The computational facility contains several multi-processor graphics workstations with hardware stereo for model building and refinement. The facility also houses a linux cluster with the appropriate software for computational calculations such as molecular dynamics, *in silico* drug docking and homology. Intensive calculations and molecular dynamics simulations are also made possible by access to the DEAC computing cluster and GPU workstations.

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Thomas Hollis, PhD Associate Professor, Department of Biochemistry http://www.wakehealth.edu/Faculty/Hollis-Thomas.htm

Freddie R. Salsbury, Jr., PhD, Associate Professor, Department of Physics http://bob.olin.wfu.edu/~web/index.html

Computational Biosciences

The Computational Bioscience portion of the Crystallography and Computational Biosciences Shared Resource provides access to cutting-edge modeling and simulation methods through consultation and collaboration with the director, Fred Salsbury, PhD. Our main expertise lies in structure-based classical modeling, docking and analysis, but additional expertise exists in computational biology/bioinformatics, and in quantum mechanical calculations

- Molecular simulations of mismatch repair proteins
- Molecular simulations of redox proteins
- Analysis of communication within proteins based on molecular simulations
- Computational modification and docking of drug leads into active sites
- Quantum mechanical calculations of model systems of novel DNA-Zn interactions
- Provide consultation to determine if the problem is amenable to computation.
- Provide consultation to decide what sort of computations need to be performed.
- Provide consultation to determine if the scale of the computations involved are worth the time
- Calculations performed include:
    - Molecular dynamics
    - Protein-protein docking
    - Protein-ligand docking
    - Various bioinformatics analyses
    - Reaction-diffusion modeling, quantum mechanical calculations and other mathematical modeling

Contact Persons: Freddie R. Salsbury, Jr., PhD; http://, Associate Professor, Department of Physics

Tumor Bank- Tumor - Tissue Shared Resource

The Tumor Bank stores fresh tissue excised in the course of standard operations to remove tumors. Samples are derived from remnant tissues not necessary for diagnostic or treatment related purposes. In addition, leukemia and bone marrow samples are also collected.

- These samples are important because they allow our faculty the ability to answer vital, basic and population science research questions related to risk factors and outcomes.
- The Tumor Tissue Facility strictly monitors quality control, so that tissues are consistent and reliable for research.

Contact Person: Dr. Greg Kucera (gkucera@wakehealth.edu<mailto:gkucera@wakehealth.edu
Tumor Tissue Shared Resource

Advanced Tumor Bank - Tissue Shared Resource
The Advanced Tumor Bank functions in the same way as the Tumor Bank except that additional information related to the samples is available to researchers. All Advanced Tumor Bank participants have consented to donate tissue, blood and/or body fluids, and have signed a HIPAA waiver to release demographic information.

- These samples are important because they allow our faculty the ability to answer vital, basic and population science research questions related to risk factors and outcomes.
- The Tumor Tissue Facility strictly monitors quality control, so that tissues are consistent and reliable for research.

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Tumor Tissue Shared Resource

MUSE™ Cardiology Information System, v 8.0
The MUSE system consists of an application/database server that stores and analyze/interpret electrocardiographic (ECG) data. The MUSE application connects client workstations to the server over the network. These workstations access the server to perform system functions such as editing, test retrieval, system setup, running database searches, and checking system status. The EPICARE Center has developed and incorporated software program to MUSE that enables automated ECG Classification by Minnesota Code and Novacode
Depending on the device and the system configuration, ECG data could be obtained via:

- wired network
- wireless network
- modem
- floppy diskette
- secure digital (SD) card
- serial download cable
- any combination of these

Contact Person: Elsayed Soliman, MD, Director, Epidemiological Cardiology Research
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5th floor 525 & Vine WF Innovation Quarter

Magellan ECG Research Workstation Software
Developed by Marquette Medical Systems' Algorithm Group, the ECG Research Workstation is used to review and export ECG waveforms, interpretations, and measurements for research purposes. This system is considered as the older version of the MUSE system and is able to perform similar tasks.

- This includes automated ECG classification by Minnesota code and Novacode using EPICARE proprietary software.

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MARS HOLTER ECG Department Server
The MARS Ambulatory ECG System provides a robust set of features for analyzing, reviewing, editing, and reporting ECG data. It also provides a variety of interfaces to external applications and systems that extend the system's core functionality.

- The MARS system can acquire ECG data from a variety of sources. MARS supports acquisition from a number of digital Holter recorders. Some of the supported recorders can connect directly to the MARS system. Others, however, require a card reader to access their data.
- MARS also supports acquisition from the CARESCAPE CIC Pro clinical information system.

- The MARS system can print ECG data and patient reports to a number of networked or local laser printers.
- The MARS system provides a number of security measures to help restrict access to patient and ECG data.
- The MARS Ambulatory ECG System provides a remote support option that allows GE support personnel to diagnose and repair problems quickly and securely.

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NAPCO Refrigerated Centrifuge (Model 2028 R)
Location: ED Clinical Decision Unit, Ground Floor, Ardmore Tower
Refrigerated centrifuge with a swing bucket rotor, Maximum speed of 4100 RPM. Temperature control range of -10°C +40°C. This centrifuge offers the following features:

- Useful for processing blood and other biological samples
- Ability to process a large quantity of samples simultaneously.
- Temperature control.

Contact person: Erin Harper, MSHS Department of Emergency Medicine (erharper@wakehealth.edu),

VWR Model 5608 -80°C Chest Freezer
Location: ED Clinical Decision Unit, Ground Floor, Ardmore Tower
This freezer is used to store biological research samples. This freezer offers the following features:

- Chart recorder to monitor temperature.
- Built in alarm sounds when temperature is outside of a preset range.
- Ability to be locked for added security of samples
- 85L sample storage capacity

Contact person: Erin Harper, MSHS Department of Emergency Medicine (erharper@wakehealth.edu),

Apple iPad
This is a 16GB iPad 3 with Wi-Fi and Bluetooth compatibility. It is useful for:

- Collecting data from research participants at the bedside
- Direct data entry into web-based electronic data capture (EDC) systems
- Providing remote access to the EMR system

Contact person: Erin Harper, MSHS Department of Emergency Medicine (erharper@wakehealth.edu)

#2 Siemens DCA Vantage Analyzer (HbA1c)

- 2 – Cholestech LDX
  - #1- SN AA 87083
  - #2- SN AA 87248
- 2 – Siemens DCA Vantage Analyzer (HbAlc)
  - #1 – 13B1X10041000018
  - #2 - @Jackson per Bettina
- 2 – Welch Allen Spot Vital Signs, 1 regular and 1 large cuff with each
  - #1 – 201103769
  - #2 – 201103770

Contact Person: Erica Hales, Maya Angelou Center for Health Equity, 713-0757

Shimadzu Prominence HPLC Systems Including UV, Y-Detector and Data Acquisition Systems

- These HPLC systems are used to separate and detect various peptides using high pressure liquid chromatography. See **shimadzu.com**

Contact Person: Mark C. Chappell, PhD, Biochemistry of Hypertension and Organ Injury Lab and HPLC & Peptide Metabolism Core Facility in HVRC (Hanes 6th floor)
https://www.adinstruments.com/research/.../wire-myograp

Milli Q Water Purification System

- A cartridge system used to purify RO water.

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https://www.adinstruments.com/research/.../wire-myograp

Biorad Benchmark Plus Microplate Reader

- Analyzes a 96 well plate using endpoint and kinetic modes, has variable wavelengths from 340-800nm. Also is temperature controlled and can incubate plates at 37C.

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Sorvall Stratos Centrifuge

- Refrigerated centrifuge that can spin 1.0- 2.0 microfuge tubes at various speeds up to 28,000g.

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Sorvall Legend Centrifuge

- Refrigerated centrifuge that can spin a variety of centrifuge tubes from 1.0ml microfuge tubes to 15ml conical tubes at various speeds up to 20,000g for microfuge tubes.

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Sorvall RC2-B Centrifuge

- Floor model refrigerated centrifuge that can spin 12 ml tubes up to 20,000g. (Note this centrifuge is about 40 years old)

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https://www.adinstruments.com/research/.../wire-myograp

IEC GP8-R Centrifuge

- Refrigerated centrifuge that spins centrifuge tubes (12x75mm to 15ml) up to 3000rpm

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Beckman Coulter Optima Ultracentrifuge

- Refrigerated Ultracentrifuge with 2 rotors. The TLA-55 rotor can spin 1.5ml Beckman Ultracentrifuge tubes at speeds up to 130,000g. The TLA-110 rotor can spin Beckman Optiseal tubes up to 600,000g.

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Packard Cobra II Gamma Counter

- Automated gamma counter that detects gamma radiation. Each rack holds 20 12x75mm tubes, and can count 5 tubes at one time. Currently is used for counting ^{125}Iodine.

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Thermo Scientific Ultima II Freezers

- Chest freezers that store samples at -80^{o}C.

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Danish Myo Technology

- (DMT) wire myograph system (Model 620M, ADI Instruments)
- Determine vascular reactivity in small vessels with a data acquisition system for 6 chambers.

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Siemens Immulite Analyzer:
The Immulite is a sequential, multi-sample, random access, chemiluminescent immunoanalyzer capable of running 120 samples/hour with a continuous run capacity every 42 minutes.
The assay menu includes the following biomarkers:

- **Allergy**
  AlaTOP Allergy Screen[1,"]ECP[1],IgE, Total

- **Anemia / Iron Metabolism-**Ferritin ,Folate, RBC Folate, Vitamin B12
- **Bone Metabolism-**Osteocalcin[1,]PYRILINKS-D
- **Cardiac-**CKMB[1,]D-Dimer[1],High-sensitivity CRP,Myoglobin,NTproBNP[1,]Troponin
- **Diabetes-**C-Peptide, Insulin, Microalbumin
- **Growth-**Growth Hormone (hGH), IGF-I, IGFBP-3
- **Reproductive Endocrinology-**Androstenedione, DHEAS, Estradiol, FSH, hCG, Free Beta HCG[1,]LH PAPP-A[1,]Progesterone,Prolactin,SHBG,Testosterone,Unconjugated Estriol
- **Metabolic-A**CTH, Cortisol, Homocysteine
- **Other-**ß-2 Microglobulin, Gastrin, Nicotine Metabolites

Contact person: Dr. Barbara Nicklas (bnicklas@wakeheath.edu), Gerontology and Geriatric Medicine.

Tecan Genios Microplate Reader:
The GENios microplate reader is a three-in-one detection reader capable of measuring absorbance, fluorescence and luminescence reactions. Manufactured to measure of a number of reaction vessel formats used by researchers, the GENios microplate reader has the following capabilities:

- Designed to handle different microplate formats (6 to 384 wells)**,** PCR tubes and cuvettes making it the ideal solution for many standard molecular biology procedures.
- Suitable for many applications ranging from gene expression and transfection studies
- Suitable for binding assays, ELISA (Enzyme-Linked Immunosorbent Assays)
- Enzyme kinetic measurements up to cell growth and proliferation studies, cytotoxicity and apoptotic (cell death) assays.

Contact person : Dr. Barbara Nicklas (**bnicklas@wakeheath.edu)**Gerontology and Geriatric Medicine

SphygmoCor XCEL
The SphygmoCor XCEL is a cuff-based device that provides non-invasive blood pressure and arterial stiffness measurements in 60 seconds. Results are displayed in relation to reference values based on the age and gender of healthy individuals. Specific vascular measures include:

- Brachial blood pressure
- Central (aortic) blood pressure
- Augmentation index (a measure of peripheral arterial stiffness)
- Carotid-femoral pulse wave velocity (a measure of aortic stiffness)

Contact person: Tina Brinkley, PhD (tbrinkle@wakehealth.edu) Gerontology and Geriatric Medicine

Mitochondrial Bioenergetics and Cellular Metabolism using a Seahorse XF-24-3
Seahorse XF technology has been adopted by leading academic institutions, pharmaceutical, and biotechnology organizations around the world. Today, it is widely recognized as a leading technology in mitochondrial bioenergetics research. The XF system provides a fast, comprehensive method for quantitatively assessing the two major energy producing pathways of cells, respiration and glycolysis.

Services Available

- Whole cell: bioenergetic profile: The four key parameters of mitochondrial function: basal respiration, ATP turnover, proton leak, and maximal respiration measured in a 24 well microplate,
- Isolation of Mitochondria for bioenergetic profiling: Using protocol standardized in the Molina lab, functional mitochondria will be isolated from various tissues and prepared for respirometric profiling.
- Isolated mitochondria: bioenergetic profile: Respiratory states: State 2, State 3, State 4, and state 3 uncoupled measured in isolated mitochondria.

- Palmitate utilization assay measures the capacity of a cell to oxidize fatty acid.
- Glycolysis test provides an assessment of glycolytic reserve by monitoring extracellular acidification in response to various compounds
- Whole cell bioenergetic profiling with permeabilized cells allows compounds and substrates, that otherwise would not cross the plasma membrane, to reach the mitochondria and be used to profile function.
- ETC profiling:
    - Respirometric analysis of specific ETC complexes
    - Expression analysis of ETC complexes by immunoblot.
- Mitochondrial DNA copy number: Mitochondrial DNA copy number assessed by qPCR

Contact person: Anthony Molina, PhD (amolina@wakehealth.edu) Gerontology and Geriatric Medicine

DEXA (Dual Energy X-ray Absorptiometry)

A DEXA scan is a special x-ray procedure that determines your body composition, including your bone mineral density, bone density content, lean tissue, and body fat. We perform scans for research studies and also clinical scans. We have a Hologic Horizon A with APEX 5 operating system and it is located Second Floor Sticht Center.

- Types of scans performed are Whole Body, AP lumbar, Hip, Proximal Femur, Forearm, IVA, and Lateral Spine

Contact person: Kim Kennedy (kkennedy@wakehealth.edu) Gerontology and Geriatric Medicine

Transportation Services

We have a staff of a full-time driver and a fleet consisting of one van and two crossover vehicles with which we can pick up research participants for their screening, clinic, or intervention visits. Additional services include, but are not limited to, transporting visiting dignitaries and timely delivery of specimen samples or equipment.

- Mature, friendly, helpful drivers
- Late model, very clean and well-kept vehicles (Ford Flexes and Freestar van)
- Convenient, comfortable, and punctual transportation service
- User-friendly scheduling

Contact person: Kim Kennedy (kkennedy@wakehealth.edu) Gerontology and Geriatric Medicine

Medical Graphics Ultima Cardiorespiratory Cart

This system is useful for:

- Indirect calorimetry for measurement of resting metabolic rate
- Electrocardiograph tracings
- Maximal graded exercise testing with measurement of VO2

Contact person: Kim Kennedy (kkennedy@wakehealth.edu Gerontology and Geriatric Medicine

AMTI AccuSway Force and Motion Platform

This system is useful for:

- Measuring postural sway
- Measuring ground reaction forces

Contact person: Kim Kennedy (kkennedy@wakehealth.edu) Gerontology and Geriatric Medicine

GAITrite Portable Mat

This system is used for temporospatial gait analysis.

- Applicable to a wide spectrum of disciplines: Geriatrics, Neurology, Orthopedics, Orthotics & Prosthetics, Pediatrics, Physiotherapy & Rehabilitation.
- Exportable footfall, gait cycle, walk and test level measurements.
- Ease of use for data capture, analysis and report generation.

Contact person: Kim Kennedy (kkennedy@wakehealth.edu) Gerontology and Geriatric Medicine

BIODEX System 4 Pro

This system is used to measure the amount of force a person is able to produce at different speeds and ranges of motion. Multi-mode operation; isokinetic, isometric, isotonic, reactive eccentric and passive

- Concentric speed up to 500 deg/sec
- Eccentric speed up to 300 deg/sec
- Concentric torque up to 500 ft-lb (680 Nm)
- Eccentric torque up to 400 ft-lb (544 Nm)
- Passive speed as low as .25 deg/sec
  - Passive torque as low as .5 ft-lb
  - Isotonic torque as low as .5 ft-lb

Contact person: Kim Kennedy (kkennedy@wakehealth.edu) Gerontology and Geriatric Medicine

Leg Extensor Power Rig

The leg extensor power rig has a role in assessing performance and monitoring improvements in sports and leisure and in rehabilitation at all ages. It provides a safe and convenient method for assessing explosive power output from the lower limb in adults of all ages and states of physical capability – from the young athlete to the frail or elderly patient.

The measurement of leg extensor power is functionally relevant; it correlates significantly with performance measurements such as stair running, ramp running and jumping in young subjects, and with stair climbing, chair rises and walking speed in elderly subjects (86 – 99 years). It allows an acceptable and useful measurement of muscle performance in the elderly, which is not confounded by balance. It is sensitive to the loss of muscle with age and to improvements with training.

Contact person: Kim Kennedy (kkennedy@wakehealth.edu) Gerontology and Geriatric Medicine

Recruitment of Research Participants

The Aging Center and Pepper Center at WFSM have extensive experience with recruitment of older adults into observational and intervention trials. We utilize all local media as well as our internal VITAL database that contains the names and addresses of over 11,500 in our community that are interested in research. We mail a newsletter twice per year to this database. Help can include:

- Assistance with direct mail that is targeted to a certain age/race/gender/zip code
- Placement of ads in our VITAL newsletter
- Placing ads in local newspapers
- Creating ads using the creative communication online tool

Contact person: Kim Kennedy (kkennedy@wakehealth.edu) Gerontology and Geriatric Medicine

Leica Autostainer XL

- Incorporates microprocessor control and user programmability to provide versatility with up to 15 programs available.
- Used for automated Hematolylin and Eosin staining of sections/cells on glass slides.
- Used for deparaffinization of paraffin sections for use in special stains or immunohistochemistry
- Used for dehydration and clearing of sections at the end of special staining procedures

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Leica IP-S Slide Printer

- Permanently imprints 4 lines of information directly on glass microscope 1" x 3" slides

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Neslab CB80 Cryobath

- Used for freezing tissue samples (fresh or fixed) at a -80C temperature

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Dako Autostainer Universal Staining system

- IHC staining of both fluorescent and non-fluorescent slides

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Leica CM1850 and CM1950 Cryostats

- Allows slicing of thin (3 microns) or thick (up to 100 microns) frozen tissue samples

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Leica RM2145 and RM2255 Rotary Microtomes

- Allows slicing of thin or thick (up to 100 microns) paraffin embedded samples

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Leica RM2265 Rotary Motorized Microtome

- Allows slicing of thin (0.5 micron) or thick (up to 100 microns) resin/plastic embedded samples
- Allows slicing of thin (3 microns) or thick (up to 100 microns) paraffin embedded samples

Contact Person : Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Leica EG1160 Embedding Center

- Used for embedding paraffin processed samples into shaped molds
- Allows user the ability to carefully orient samples

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Shandon Citadel 1000 Tissue Processor

- Used for dehydration, clearing, and paraffin infiltration of fixed, small tissue samples, cell pellets
- 4 programs allowing a variety of length of processing run for varied sizes of fixed tissues
- Gentle agitation and movement helps maintain soft, delicate sample integrity

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Leica ASP300S Tissue Processor

- Used for dehydration, clearing and paraffin infiltration of fixed small to large tissue samples
- 12 programs that allow a large variety of length of processing run for various sizes and density of fixed tissue samples

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Cytopro 7620 Cytocentrifuge

- A complete general purpose cytocentrifuge system for depositing cells onto microscope slides
- Incorporated microprocessor control and user programmability to provide great versatility.

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Toshiba TSX-101A CT Scanner

- 32 slice scanner that converts data into 3D images

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Hitachi S-2600 N Microscope

- Scanning Electron Microscope (SEM)
- Produces images of samples by scanning with focused beam electron
- Supported by Anatech LTD Hummer 6.2 which coates samples before scanning

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Beckman Synchron Clinical System

- Model CX5CE
- Sample testing system for up to 16 tests

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Siemens Advia 120 Hematology System

- Performs Complete Blood Count Analysis (CBC)

Contact Person : Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Model 3017 Sterilizer

- 100% Ethylene Oxide sterilizer for items too delicate for steam autoclave, such as plastics and electrical. Cycle time from 5 hours with no aeration to up to 48 hours with aeration

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Century SV120 and Reliance LV250 Sterilizers

- Steam autoclaves. Cycle times approximately 1 hour in duration

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

LI-COR Pearl Impulse Imager

- Analyzes fluorescent images

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Olympus FV1000 MPE Confocal / Multiphoton Microscope

- FV1000 Visible confocal & MPE Multiphoton laser scanning microscope
- 4 lasers capable of entire visible spectrum
- Multi area time lapse (MATL) and Z capability
- Brighter and deeper imaging with better resolution
- Equipped with GaAsP for greater sensitivity
- Multiphoton can image up to 8mm in to clear substances
- Objectives include: dry, immersion, oil, 25x MPE, SCALE and stick

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

Olympus BX-63 Multispectral Imaging system

- Equipped with Olympus DP72 color camera
- Ability to scan entire slide in BF or Fluorescence
- Equipped with Nuance multispectral camera and software
- Equipped with InForm software for segmentation and quantification
- Ability to spectrally unmix and reduce background
- Objectives include: dry, oil and silicone

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

IVIS (In Vivo Imaging Systems)

- For fluorescent, bioluminescent, chemiluminescent and Cherenkov sources
- Equipped with Isoflurane anesthesia chamber (must provide Isoflurane)
- Images mice, rats or culture plates
- X-ray provides anatomical overlay
- Non-invasive longitudinal monitoring of disease progression, cell trafficking, antibody probe binding, peptide binding and gene expression patterns in living animals

Contact Person: Dan Simmons (dasimmon@wakehealth.edu), WFIRM Analysis Resources 336-713-7291.

TRANSONIC T402 2-CHANNEL MODULAR FLOWMETER

- A microsurgical instrument and data analysis machine that is used for recording precision blood flow measurements in various research applications. This system is useful for
- Sensing and recording flow volume in rodent vasculature using perivascular flowprobes.

Contact person: Dr. Liliya Yamaleyeva (lyamaley@wakehealth.edu), Hypertension and Vascular Research Center

HARRIS MANUFACTURING CO FREEZER

- A-80°C freezer that stands upright and has five shelves, each with its own door to help maintain a stable temperature. It holds and preserves precious samples collected by investigators for ongoing analytical research.

Contact person: Carolynne McGee (cmcgee@wakehealth.edu), Hypertension and Vascular Research Center

SIEMENS HEALTHCARE DIAGNOSTICS RAPIDLAB248 BLOOD GAS ANALYZER

An analytical machine used for accurate determination of pH, PCO_2 and pO_2 in heparinized whole blood samples. This system is useful for

- Calculating various parameters of blood content including total carbon dioxide, blood and extra cellular fluid bases, oxygen saturation, etc.
- Helps indicate the presence of certain disorders or abnormalities in the lungs, kidney, and heart.

Contact person: Dr. Liliya Yamaleyeva (lyamaley@wakehealth.edu) Hypertension and Vascular Research Center

BIOPAC MP100 BIOFEEDBACK WORKSTATION

A computer based acquisition system that consists of several components including hardware and software. The system is generally used for continuous data collection of physiological processes and responses. This system is useful for

- Cardio-pulmonary measurements
- Neuro-physiology measurements
- Aggregate sample collection
- Data plotting, calculation and interpretation

Contact person: Dr. Bridget Brosnihan (bbrosnih@wakehealth.edu) Hypertension and Vascular Research Center

RADNOTI BLOOD VESSEL PERFUSION SYSTEM

- A special perfusion system used in blood vessel research pertaining to reactivity, endothelial function, and vasoreactive effects of various substances. The system allows researchers to simultaneously monitor multiple vessels, which are housed in a temperature controlled, flow adjusted system. This particular setup contains a transducer positioner, glass tissue/organ bath and an elaborate system of tubing for easy evacuation of water baths and experimental solutions.

Contact person: Dr. Liliya Yamaleyeva (lyamaley@wakehealth.edu) Hypertension and Vascular Research Center

LIVING SYSTEMS MICRO VESSEL IMAGING SYSTEM

A complex system used to measure vascular reactivity in a temperature and pH controlled system when exposed to various vascular mediators. This system is helpful for

- Analyzing the effects of different stimulants and suppressants on in-vitro vessel reactivity.

Contact person: Dr. Bridget Brosnihan (bbrosnih@wakehealth.edu) Hypertension and Vascular Research Center

BECKMAN COULTER LS6500 LIQUID SCINTILLATION BETA COUNTER

- LS6500 is used for assay analysis and sample extraction efficiency using H^3 radioactive isotope.

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

WALLAC LKB MULTIGAMMA 1260 COUNTER

- LKB Multigamma 1260 Counter is used for clinical/research RIA analysis and research sample extraction efficiency using I^{125}- radioactive isotope.
- Analyzes one 12-tube rack at time for 5 minutes. Counter is not automated.

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

PACKARD COBRA II 5002 GAMMA COUNTER

- Cobra II 5002 Gamma Counter is used for clinical/research RIA analysis using 125-I radioactive isotope.
- Automated counter; counts one sample a time for 1 minute. Each rack holds (15) 12x75mm tubes.

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

NOVA I ELECTROLYTE ANALYZER

- Nova Electrolyte Analyzer is fully automated, 40-position sample tray for batch analysis.
- Sodium and Potassium analysis using serum and urine samples; multi-species.

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

MOLECULAR DEVICES SPECTRAMAX 340 MICROPLATE READER

- Spectramax 340 Microplate Reader analyzes a 96 well microplate using endpoint, kinetic, and spectral scan modes.
- Uses Softmax Pro Windows Software
- Temperature controlled that allows a microplate to incubate at 37° C.

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

CALIPER RAPID TRACE SPE ROBOTIC WORKSTATION SYSTEM

- Rapid Trace SPE Robotic is an automated sample Solid Phase Extraction (SPE) system.
- Uses 3 ml SPE cartridges for urine Angiotension extractions.
- We have four workstations (units).
- Can process up to 10 samples on each workstation in approximately 2 hours unattended.

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

AUSHION CIRASCAN IMAGING SYSTEM

- Cirascan Imaging System is for quantitative chemiluminescent with multiplex ELISA analysis of protein biomarkers.
- Analysis using serum, plasma, and urine micro samples
- Multiplex ELISA 96-well plate can contain up to 12 biomarkers

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

SAVANT SPEEDVAC CONCENTRATOR

- Savant SpeedVac Concentrator is a general-purpose concentrator that provides concentration of both aqueous and mild organic solvent-based samples for research applications.
- Allows you to choose vacuum, heat, and time setting.
- Holds up to 200 12x75mm or 13x100mm tubes.

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

THERMO FISHER IEC-GP8R REFRIGERATED CENTRIFUGE

- IEC-GP8R Refrigerated Centrifuge can spin a variety of centrifuge tubes (12x75mm-16x100mm) at speed of 1000 – 2500 rpm.

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

THERMO FISHER IEC-6000 REFRIGERATED CENTRIFUGE

- IEC-6000 Refrigerated Centrifuge can spin a variety of centrifuge tubes (12x75mm-16x100mm, 15-50 ml) at speed of 1000 – 3000 rpm.

Contact person: K. Bridget Brosnihan, PhD, and TanYa Gwathmey-Williams, MD, PhD, Hypertension Assay Core Laboratory / Hypertension & Vascular Research Center (Reynolds M floor)

BECKMAN COULTER ACCUSPIN3R CENTRIFUGE

- Accuspin3R Centrifuge can spin a variety of centrifuge tubes (12x75mm-16x100mm) at speed of 1000 – 4000 rpm.
- Variable temperature 2-28° C (refrigerated or at room temperature).

Lab Contact Person: Pam Dean (pdean@wakehealth.edu) Hypertension Core Laboratory

EMKA/MILLAR IOX-BASE MPVS-300 PRESSURE-VOLUME SYSTEM (Hanes 6013)

- Emka/Millar pressure-volume (PV) system allows functional determinations of cardiac dynamics using pressure-volume conductance catheters. A large number of load-dependent and load-independent hemodynamics parameters and indices of systolic and diastolic function can be derived from PV relations such as end-systolic pressure (ESP), end-diastolic pressure (EDP), end-systolic volume (ESV), end-diastolic volume (EDV), stroke

volume (SV), maximum and minimum dP/dt (±dP/dt), tau (τ), end-systolic PV relation (ESPVR), and end-diastolic PV relation (EDPVR).

Contact Person: Jasmina Varagic, MD, PhD, Physiology of Hypertension Lab and Transgenic Animals and Instrumentation Core Facility in HVRC (Hanes 6th floor)

VISUAL SONICS VEVO LAZR PHOTOACUSTIC IMAGING SYSTEM (Hanes 6048)

Vevo LAZR imaging system offers high-frequency, high-resolution digital imaging with linear array technology in a wide range of applications in small animal models. It also integrates ultrasound modality with photoacoustic based modality that enables co-registration of photoacoustic and anatomical images in both 2D and 3D planes. Applications include:

- Comprehensive assessment of cardiac structure and function
- Anatomical identification of blood vessels and blood flow quantification
- Assessment of organ or tumor perfusion using contrast imaging functionality and microbubble perfusion
- Visualization and quantification of molecular markers *in vivo*, in real-time
- Monitoring of tumor growth, volume, and angiogenesis
- Tissue hypoxia assessments through hemoglobin content and oxygen saturation quantifications

Contact person: Jasmina Varagic; jvaragic@wakhealth.edu, Hypertension and Vascular Research Center

DSI DATAQUEST A.R.T. TELEMETRY SYSTEM (Hanes 7029)

DSI Telemetry system provides monitoring of physiological parameter in small animals models using freely moving animals. The system support simultaneous data acquisition and analysis in 24 rats. The telemetry system is useful in:

- Continuous monitoring of blood pressure, heart rate, and activity up to 6 months in minimally disturbed animals
- Monitoring of diurnal variations in blood pressure, heart rate, and activity
- Reliable detection of small changes in blood pressure (~5 mm Hg)
- Collecting blood pressure data for analysis of central regulation of blood pressure by evaluation of spontaneous baroreflex sensitivity

Contact Person: Jessica VonCannon (jvoncannon@wakhealth.edu), Hypertension and Vascular Research Center

ABI Prism 7000 Sequence Detection System

- The ABI Prism7000 Sequence Detection system combines thermal cycling, fluorescence detection, and application-specific software. It detects accumulated polymerase chain reaction (PCR) product cycle-by-cycle, thus making quantification available immediately after completion of PCR, without the need for further process analysis.

Contact person: Patricia E. Gallagher, PhD, and E. Ann Tallant, Ph.D., Hypertension Cell and Molecular Biology in HVRC (Hanes 6th floor)

Agilent 2100 Bioanalyzer

- The Agilent 2100 Bioanalyzer system provides sizing, quantitation and quality control of DNA, RNA, proteins and cells on a single platform, providing high quality digital data.

Contact person: Patricia E. Gallagher, PhD, and E. Ann Tallant, Ph.D., Hypertension Cell and Molecular Biology in HVRC (Hanes 6th floor)

Leica Microtome

- The Leica manual rotary microtome sections tissue in paraffin-embedded blocks for immunocytochemistry.

Contact persons: Dr. Patricia E. Gallagher (pgallagh@wakehealth.edu), Dr. E. Ann Tallant (atallant@wakehealth.edu) or Rob Lanning (rlanning@wakehealth.edu), Hypertension and Vascular Research Center

MCID COMPUTERIZED DENSITOMETRY WORKSTATION

- A computer based imaging system for acquiring black and white images of films for gels and receptor autoradiography. The systems consists of a light box with controlled variable illumination, a video camera input and computer software (MCID/M5+ IMAGING SYSTEM W/NEC POWERMATE 8100 COMPUTER) for capturing and measuring density of images and standards for absolute and relative quantification.

Contact person: Ellen Tommasi /Hypertension Cell and Molecular Biology Laboratory in HVRC (Hanes 6th floor)

BIOPAC MP100 BIOFEEDBACK WORKSTATION

A computer based acquisition system that consists of several components including hardware and software. The system is generally used for continuous data collection of physiological processes and responses. This system is useful for

- Cardio-pulmonary measurements
- Neuro-physiology measurements
- Aggregate sample collection
- Data plotting, calculation and interpretation

Contact person: Ellen Tommasi /Hypertension Cell and Molecular Biology Laboratory in HVRC (Hanes 6th floor)

HACKER-BRIGHT MICROTOME CRYOSTAT

- Standard cryostat for sectioning frozen fixed or unfixed tissues.

Contact person: Ellen Tommasi /Hypertension Cell and Molecular Biology Laboratory in HVRC (Hanes 6th floor)

COLUMBUS NIBP-2 NON-INVASIVE BP MONITORING SYSTEM

- A tail cuff blood pressure system for use in rodents.

Contact persons: Ellen Tommasi, 6-3811 (etommasi@wakehealth.edu), Hypertension and Vascular Research Center

Clinical Non-Invasive Hemodynamics Core in HVRC (Janeway 5th floor)

- Our non-invasive testing capabilities include a variety of measures of vascular and autonomic function. The descriptions below highlight the main purpose of each machine. Tests are available for both research studies and clinical patient diagnosis and management.

Contact Person: Dr. Hossam Shaltout at: hshaltou@wfakehealth.edu Hypertension and Vascular Research Center.

ELECTRICAL IMPEDANCE CARDIOGRAPHY (ICG), THE BIOZ®, MODEL BZ 4110-101D, BY CARDIO DYNAMICS, SAN DIEGO, CA

The technology relies upon the minute current transmitted across the thorax by ICG seeking its path of least resistance. The impedance changes of the blood flow through the aortic arch are measured on a beat by beat sequence from which we can measure the following parameters:

- Stroke volume (SV)
- Cardiac output (CO)
- Systemic vascular resistance (SVR)
- Thoracic fluid volume (TFC) and other hemodynamic variables are calculated.
- The simplicity of the procedure allows the recording of twelve hemodynamic variables within minutes.

Contact Person: Dr. Hossam Shaltout at: hshaltou@wfakehealth.edu Hypertension and Vascular Research Center

THE SPHYGOMOCOR PX PULSE WAVE ANALYSIS SYSTEM (MODEL SCOR-PX), BY ATCOR MEDICAL, LISLE, IL

This device measures the following parameters:

- Central aortic pressure
- Pulse wave velocity
- Augmentation and augmentation index of the pulse wave.

Contact Person: Dr. Hossam Shaltout at: hshaltou@wfakehealth.edu Hypertension and Vascular Research Center

HDI/PULSE WAVE CR-2000, HYPERTENSION DIAGNOSTICS INC, EAGAN, MN)

This machine evaluates the following parameters:

- The diastolic portion of the wave
- An estimate of the stroke volume and cardiac output
- Systemic vascular resistance and total vascular impedance
- Large artery and small artery elasticity indices, C1 and C2

Contact Person: Dr. Hossam Shaltout at: hshaltou@wfakehealth.edu Hypertension and Vascular Research Center

COLIN VP-2000/1000 VASCULAR PROFILING SYSTEM BY COLIN CORPORATION, SAN ANTONIO, TX

This machine measures:

- Arterial pulse wave velocity simultaneously and bilaterally
- carotid-femoral (cf), brachial-heart, heart-femoral, femoral-ankle, and brachial-ankle (ba) pulse wave velocity
- The ankle/brachial index (ABI)
- The carotid augmentation index

Contact Person: Dr. Hossam Shaltout at: hshaltou@wfakehealth.edu Hypertension and Vascular Research Center

AMBULATORY BLOOD PRESSURE MONITORING, ABPM. SPACELABS MEDICAL, MODEL 90207, ISSAQUAH, WA

Standard 24 hour monitoring certainly is the most readily available and commonly used device. It records

- Sleeping and active blood pressure and heart rate
- Blood pressure variance, and nocturnal changes.

Contact Person: Dr. Hossam Shaltout at: hshaltou@wfakehealth.edu Hypertension and Vascular Research Center

CNAP MONITOR 500 NONINVASIVE BLOOD PRESSURE AMPLIFIER WITH DETERMINATION OF BAROREFLEX SENSITIVITY (BRS) FOR CONTROL OF HEART RATE, HEART RATE VARIABILITY (HRV) AND BLOOD PRESSURE VARIABILITY (BPV)

Continuous blood pressure, heart rate acquired from noninvasive finger arterial pressure measurement via Biopac system in addition to ECG for a minimum of 10 minutes. Systolic arterial pressure (SAP) and RR intervals (RRI) files generated via the data acquisition system (BIOPAC acquisition software, Santa Barbara, CA) at 1000 HZ will be analyzed using Nevrokard BRS software (Nevrokard BRS**,** Medistar, Ljubljana, Slovenia) to obtain the following measures of BRS, HRV and BPV.

- Measures of sympathetic function
- Measures of parasympathetic function
- Measures of baroreflex control of heart rate
- Non-invasive blood pressure and heart rate
- Heart rate variability
- Blood pressure variability

Contact Person: Dr. Hossam Shaltout at: hshaltou@wfakehealth.edu Hypertension and Vascular Research Center

Siemens MAGNETOM Skyra 3T MRI Scanner Located on the main campus.

The Siemens MAGNETOM Skyra 3T MRI Scanner with TIM Technology has the following features:

- 3T Siemens Skyra operating at D13 platform
- Gradient field strength of 45 mT/m, SR 200 T/m/s
- 70 cm open bore design, weight limit 500 lbs
- Capable of Advanced DTI, BOLD, Spectroscopy, ASL, Map-It (cartilage)
- Equipped with stimulation equipment for fMRI studies
- Various coils including 32 channel head coil, 20 channel head/neck, 18 channel body, 32 channel spine, 15 channel knee and surface loop coils.
- Contrast Power Injector

Contact Person: Sandy Kaminsky: skaminsk@wakehealth.edu 716-3415
Sandra White: sawhite@wakehealth.edu 716-2555

GE PETtrace 10 Cyclotron

The GE PETtrace Radiotracer Production System is a compact, automated cyclotron and radiochemistry system designed for the fast, easy, and efficient production of PET radiotracers. The PETtrace System is centered on a compact negative ion cyclotron of proven design. The PETtrace Cyclotron features a vertical mid-plane and can accelerate protons to 16.5

MeV and deuterons to 8.4 MeV of energy. The system can be configured with various targets/process systems for production of common PET radioisotopes. The high performance, flexible design is ideal for applications in a research setting. Located on the main campus.

- oxygen-15, nitrogen-13, carbon-11, and fluorine-18 production
- Tracers automatically transferred to the radiochemistry processing systems

Contact Person: Akiva Mintz amintz@wakehealth.edu 716-3590

GE 16-slice PET/CT Discovery ST Scanner

The PET/CT Discovery ST Scanner has 24 detector rings that provide 47 contiguous image planes over a maximum 70 cm transaxial field of view with CT attenuation correction. Axial spatial resolution of this scanner is 3.27 mm at the center of the gantry. Data acquisition modes include static, dynamic, whole body, and gated. The room is equipped with anesthesia gases and exhaust for scavenging the gases. There is a dedicated viewing area to interpret scans and a data analysis room. In addition, a dedicated research PACS for PET has been created to store PET data in DICOM format (images and raw data).oxygen-15, nitrogen-13, carbon-11, and fluorine-18 production. Located on the main campus.

- Tracers automatically transferred to the radiochemistry processing systems

Contact Person: Akiva Mintz amintz@wakehealth.edu 716-3590

Radiochemistry Laboratories

Radiochemistry laboratory (1,350 sq. ft.): Two Capintech Hot Cells, two Comecere hot cells, four mini-cells, and a GE [11C] methyl iodide synthesis box for radiochemistry and a Trasis AllinOne synthesis box for [18F] radiochmistry. In an area remote from the hot cells and shielded fume is a laboratory containing three fume hoods, a shielded rotary evaporator, and a rotary chromatatron, and a laminar flow hood. Two additional Hot Cells were installed in 2005. Laboratory contains a separate dedicated QC room and final vial preparation suite that contains a USP<797> compliant work area for human tracer preparation.

Organic chemistry laboratory (860 sq. ft.): three fume hoods, two rotary evaporators, one Perkin Elmer series 1600 FT-IR for characterization of synthesized compounds, a high range vacuum pump, several (more than five) HPLC systems attached with radioisotope and UV detectors for radiochemical synthesis, Varian GLC (TC and radiation detectors), and TLC scanner.

A second organic chemistry laboratory (478 sq. ft.): three chemical fume hoods, a rotary evaporator, two high vacuum pumps, and several routine laboratory instrumentation to perform chemical synthesis.
Metabolite analysis lab: Varian Analytical HPLC (attached with UV and radioisotope detectors) for metabolite analysis, three micro-centrifuges, a rotary evaporator, and a Packard Cobra II auto-gamma counter. Located on the main campus.

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Analysis Capabilities

GE Advantage Workstations

- Advanced 2-D/3-D/4-D real-time rendering and visualization imaging workstation
- Render images from any modality in 3-D from a stack of 2-D DICOM images

- Volumetric, area, and distance measurement capabilities
- Advanced segmentation and analysis modules
- MPR, MIP, 3-D, 4-D
- Located on the main campus.

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PMOD Analytical Workstations (http://pmod.com/technologies/products/products.html)
PMOD consists of a set of user-friendly and powerful tools, each corresponding to a major task. The general modeling tool contains a comprehensive set of models for the analysis of time-activity data. With the tool specialized models can be applied to calculate functional maps showing absolute tissue parameters. The cardiac modeling tool is tailored to assess function in cardiac segments by full kinetic modeling, and to compare the outcome against normal databases. The image fusion tool not only allows to register images, but also enables the user to explore the calculated functional images in detail. Further interactive investigation is facilitated by the versatile 3D rendering tool. Located on the main campus.

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