

INSTITUTIONAL RESEARCH CORES

THE UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER



INTRODUCTION



The UTHSC Office of Research strives to provide outstanding shared resources that will enhance discovery, productivity and the reputation of our research enterprise.

This handbook introduces each of UTHSC's Institutional Research Cores, including services and major instrumentation/technology platforms, core leadership, contact information, and examples of scientific research supported by each.

In FY22, our institutional core facilities served over 150 research laboratories. Key accomplishments for FY22-FY23 include:

- The Medicinal Chemistry Core supported an NIH RO1 project where promising drug candidates synthesized by the core were recognized by UTRF, and a provisional patent was prepared. This is the first intellectual property outcome for the core since it was established.
- The director of the Molecular Bioinformatics Core was an invited speaker at the Arkansas Bioinformatics COVID-19 AI meeting. The core also replaced two aging data analysis systems, added a new large data storage array, and created a single-cell analysis pipeline as well as an ATAC seq pipeline for users.
- The Lab Animal Care Unit received an NIH R24 "Modern Equipment for Shared-use Biomedical Research Facilities" award to improve animal care facilities. Modernized equipment was purchased, including automated watering.
- The Regional Biocontainment Laboratory (RBL) received a facilities grant (G20 award) to upgrade existing infrastructure and to purchase new scientific equipment to enhance existing services and to provide new services.
- The RBL also designed and offered new services related to the SARS COV-2 (COVID-19) pandemic, including drug discovery services. It served over 30 external users from FY22-FY23, the highest volume since the RBL opened.
- The Flow Cytometry and Cell Sorting Core was awarded an S10 large instrumentation grant to purchase a Cytex Aurora CS sorter capable of spectral analysis.
- The Molecular Resource Center negotiated with Illumina to reduce next-generation sequencing (NGS) costs in-house.

For more information about any of the cores, visit uthsc.edu/research/institutional-cores/.

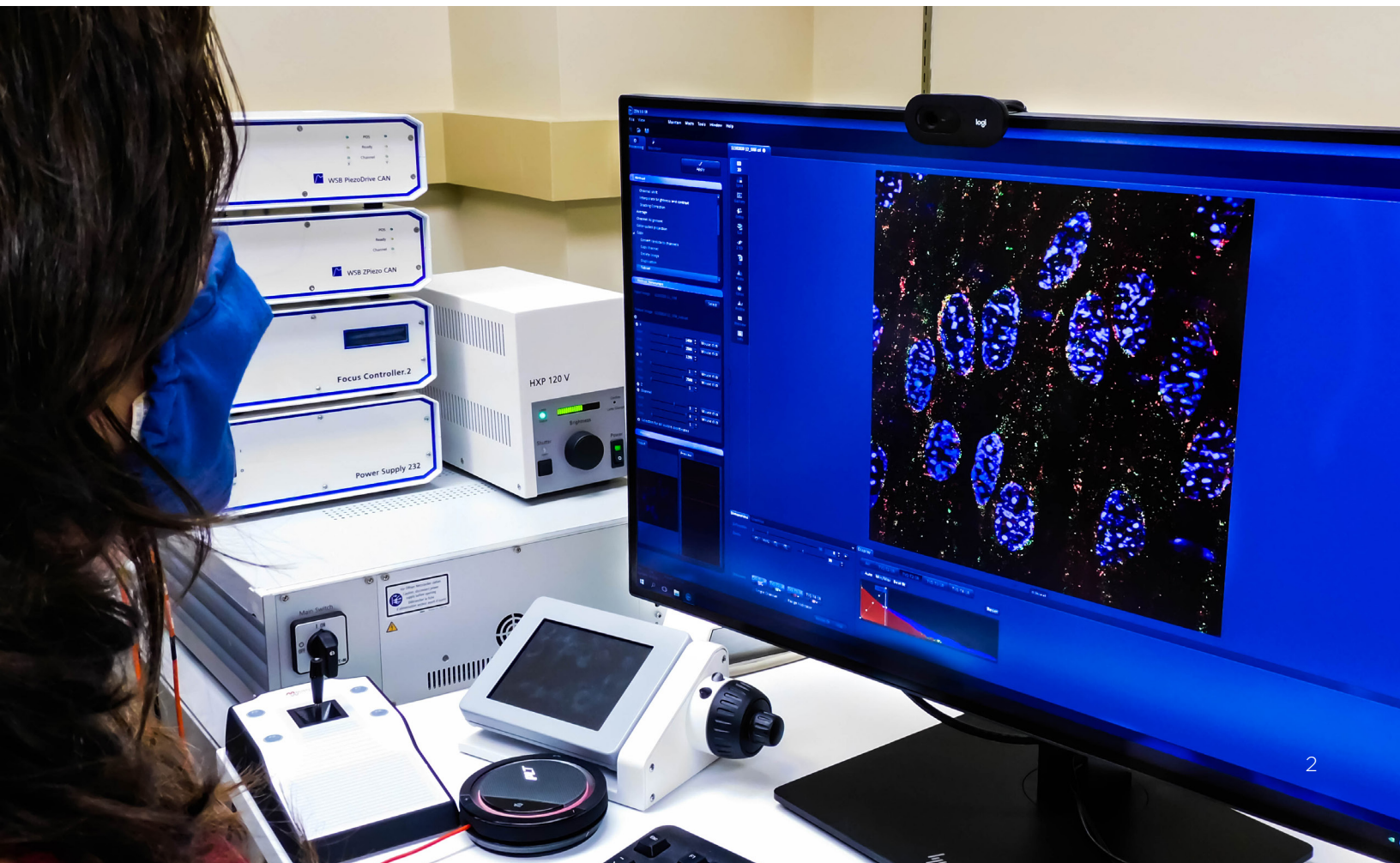
On behalf of the faculty and staff in UTHSC's Institutional Research Cores, we look forward to working with you to advance research across all areas at UTHSC.

A handwritten signature in black ink, appearing to read "Tiffany N. Seagroves".

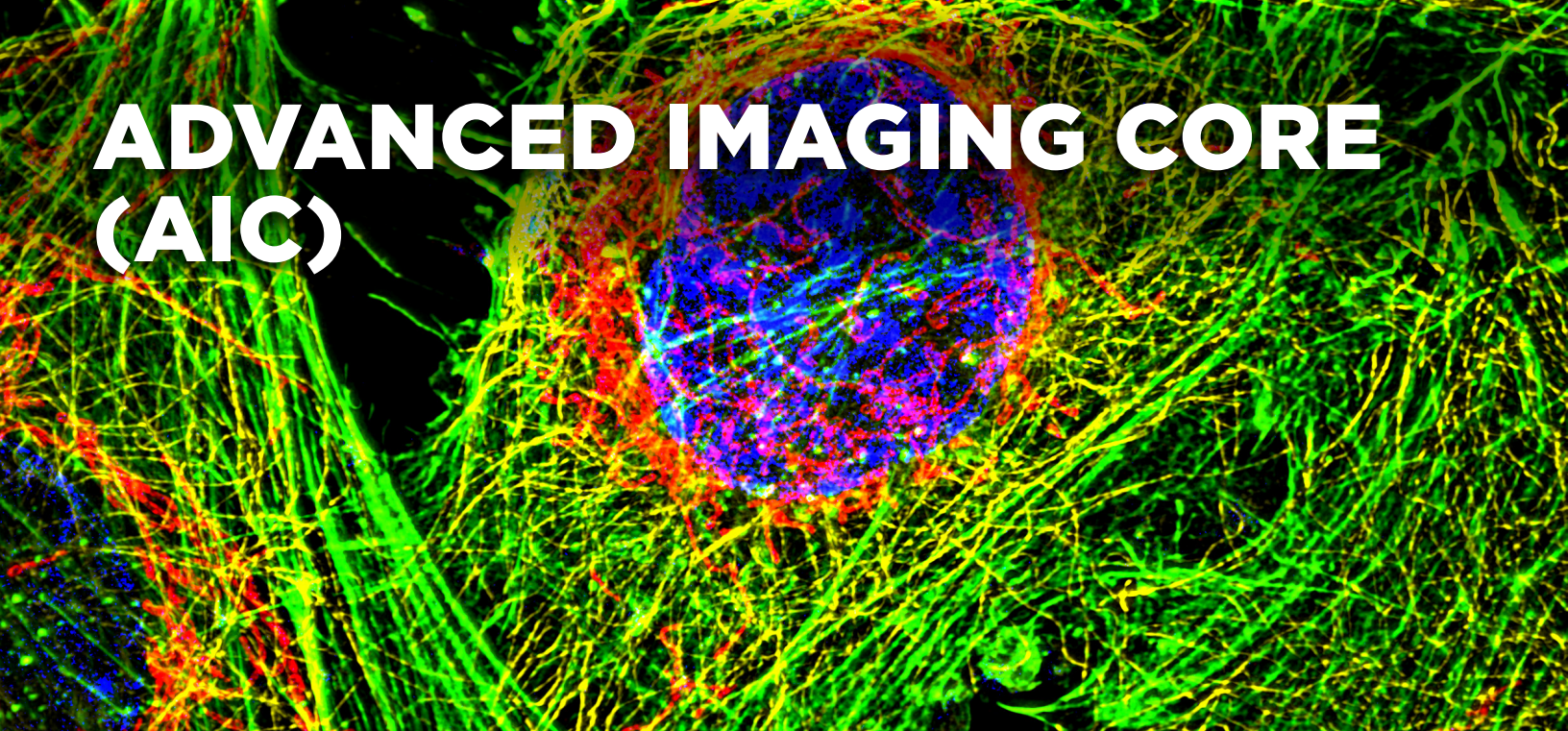
Tiffany N. Seagroves, PhD
Associate Vice Chancellor, Institutional Research Core Laboratories

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ADVANCED IMAGING CORE (AIC)



The Advanced Imaging Core (AIC) provides super-resolution microscopy imaging services through its state-of-the-art equipment and expertise. The AIC houses super-resolution microscopy imaging equipment, enabling researchers to capture sub-cellular structures and to identify protein localization patterns with high accuracy in both 2D and 3D. These cutting-edge technologies minimize sample photo damage during imaging. Live imaging on the Zeiss Elyra 7 system allows users to track fast cellular processes such as vesicle movement, and to observe a myriad of signaling events.

In addition to maintaining the Elyra 7, the AIC offers expert technical assistance to investigators, including experimental design/consultation, microscope training, assistance with imaging, and post-acquisition data analysis.

EQUIPMENT AND CAPABILITIES

SUPER RESOLUTION MICROSCOPY (SRM) UNIT

Zeiss Elyra 7 equipped with 4 Laser lines (405, 488, 561, 642) and 4 Objective lenses:

- EC-Plan Neofluar 10x/0.30 M27
- Plan-Aprochromat 40x/1.4 Oil DIC M27
- Plan-Aprochromat 63x/1.4 Oil DIC M27
- alpha Plan-Aprochromat 63x/1.46 Oil Corr M27

The Zeiss Elyra is capable of 2D and 3D wide-field microscopy, Lattice Structured Illumination Microscopy (SIM), Total Internal Reflectance Fluorescence Microscopy (TIRFM), and Single-Molecule Localization Microscopy (SMLM).

Lattice SIM allows very light-efficient imaging, resulting in less photodamage to cells. Key features include:

- 2D imaging speeds up to 255 fps
- image up to 4 channels at a time;
- resolution down to 120 nm laterally, 300 nm axially.

SMLM utilizes photo-switchable fluorescent dyes and proteins to induce spontaneous “blinking” of single fluorophores. This allows investigation of subcellular structures and single molecules in both fixed and live cells. Key features include: dual camera capability to image two different fluorophores at once; resolution down to 20 nm laterally and 50 nm axially.

STAFF



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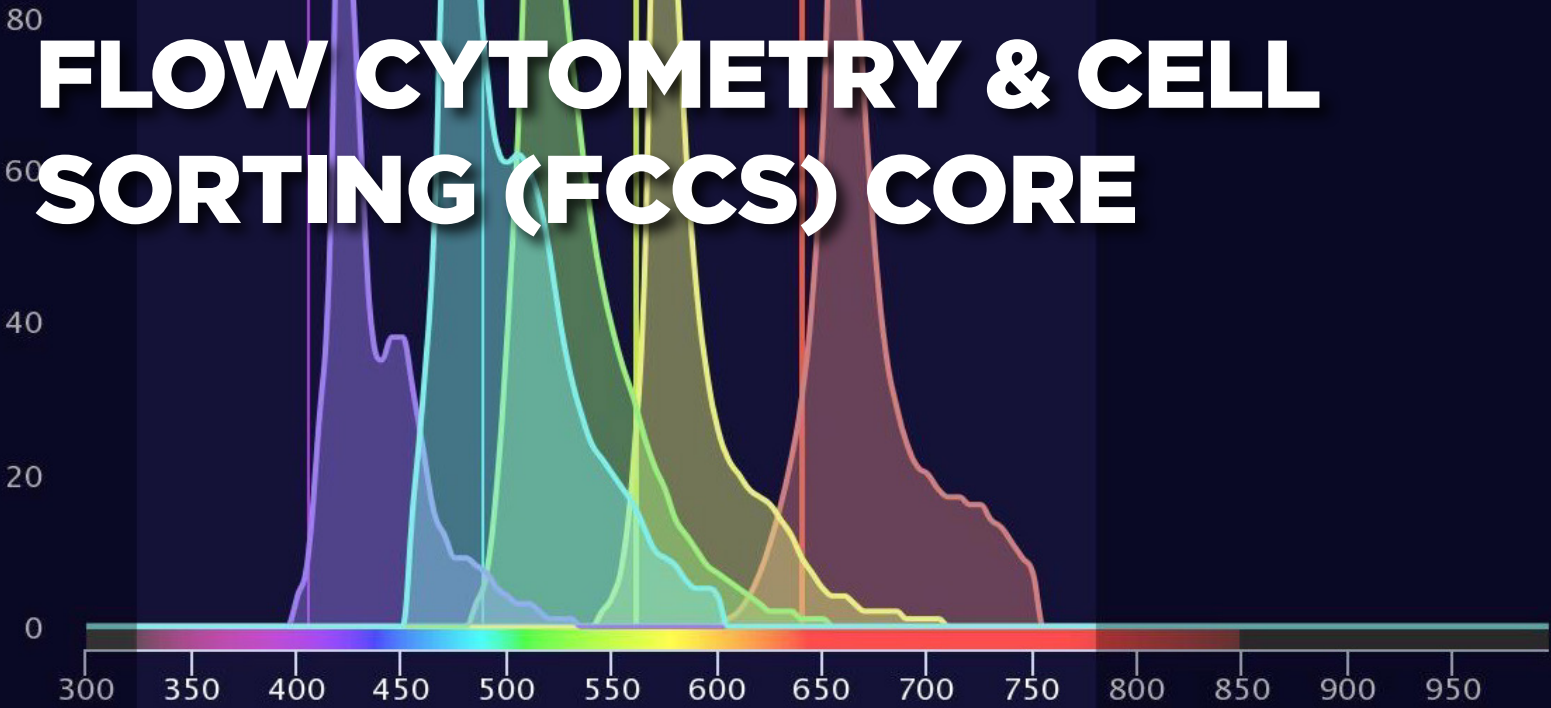
Dr. Escue graduated from Christian Brothers University in 2010 with a BS in Biomedical Sciences. From 2009-2011, she performed lab work in the Pharmaceutical Sciences department at St. Jude Children's Research Hospital, genotyping patient samples for pharmacogenetics studies. In 2018, she received her doctorate from UTHSC, completing her dissertation research in the Department of Physiology in Dr. Kaushik Parthasarathi's lab. Her work focused on inflammatory signaling mechanisms within the rodent pulmonary microvasculature. She is well-versed in performing high-resolution fluorescence imaging, having spent seven years performing intricate confocal imaging experiments on isolated, autologous blood-perfused rat and mouse lungs. Dr. Escue completed her training on the Elyra 7 Super-resolution microscope in late 2020.

For more information:

ADVANCED IMAGING CORE (AIC)

Johnson Building | 847 Monroe Avenue, Room 311, Memphis, TN 38163

uthsc.edu/research/institutional-cores/advanced-imaging-core/



FLOW CYTOMETRY & CELL SORTING (FCCS) CORE

The Flow Cytometry and Cell Sorting (FCCS) Core provides state-of-the-art instruments, expertise, instruction, and assistance with experimental design and data analysis for multicolor flow cytometry and cell sorting experiments, including indexed single-cell sorting. We offer one-on-one consultation with internal investigators at no charge for experimental design, training in the use of the instrumentation (hourly rate), and software resources. The core director, a highly experienced immunologist and flow cytometry and cell sorting expert, is also available to analyze investigators' data (hourly rate).

EQUIPMENT

The **BD Biosciences FACSria II** cell sorter is equipped with 4 lasers and 12 fluorescence detectors, in addition to forward (FSC) and side (SSC) scatter detectors. The 100 mW, 488 nm blue diode laser has 5 fluorescence, SSC, and FSC detectors. The 30 mW, 638 nm red diode laser has 3 fluorescence detectors. The 50 mW, 405 nm violet diode laser has 2 fluorescence detectors, and the 20 mW, 355 nm solid-state UV laser has 2 fluorescence detectors. The sorter has two- and four-way sort capability into tubes or microtubes. The sorter is also equipped for indexed, single-cell sorting or multiple cell sorting into microwell plates or onto microscope slides. The sorter has temperature-controlled sample injection and collection chambers within a biosafety level-2 (BSL2) laboratory and includes an Aerosol Maintenance System to prevent exposure to potentially infective agents during cell sorting.

The **Cytek Aurora CS** - coming fall of 2023 - is a spectral cell sorter equipped with 5 lasers (UV, Violet, Blue,

Yellow-Green, Red), 3 scatter detectors (FSC, SSC, 405 SSC) and is capable of analyzing 40+ parameter panels. The sorter has 6-way sorting capability and is equipped for indexed and single-cell sorting into 96-well plates. This sorter is expected to replace the FACSria II.

The **Bio-Rad ZE5** cell analyzer is a 4 laser, 21-fluorescence parameter, highly automated cytometer, with a 4-7-7-3 configuration for blue, yellow-green, violet, and red lasers, respectively, which includes detection of popular "fruit" dyes and standard FSC and SSC light detection. The instrument also has the capability for small particle detection (exosomes, subcellular particles, and bacteria). The Everest software is user friendly, offering operator-independent programmable sample loading and data collection for up to 48 tubes, as well as from 96-well plates.

Also available for use at no additional charge are FlowJo® and ModFit® software on workstations with either PC Windows or Apple OSX operating systems for advanced data analysis and cell cycle modeling, respectively.

CORE CAPABILITIES

The FCCS core supports:

- Detection and quantification of up to 21 cell surface and/or intracellular molecules
- Detection and quantification of GFP, mCherry, or other fluorescent protein expression including “fruit” dyes
- Measurement of Ca²⁺ flux during cell signaling among different cell subpopulations
- DNA quantification, cell cycle analysis, and apoptosis detection and quantification
- Detection and quantification of exosomes
- High-speed sorting of viable or fixed eukaryotic or prokaryotic cells into four or fewer defined subpopulations
- Single or multi-cell sorting into microwell plates or onto microscope slides
- Indexed single cell sorting into microwell plates or onto microscope slides
- Immunology and flow cytometry expertise for fluorochrome panel design, immuno-phenotyping, and data analysis
- Spectral flow cytometry will be supported post-acquisition of the Cytex Aurora CS sorter

STAFF



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Dr. Deidre Daria has over 20 years of flow cytometry experience in both academic and CRO institutions designing multi-color fluorescence phenotyping schemes

for cellular phenotyping and shorting of various cell types. At the UTHSC FCCS, Dr. Daria assists users with experimental design, panel development, data analysis and many other facets of flow cytometry. She also trains new users and is responsible for instrument operation and maintenance. Dr. Daria received her PhD at the University of Ulm, Germany with subsequent postdoc experience at Batelle. Her research experience has encompassed numerous projects associated with hematopoiesis and stem cell biology. She was also involved in studies designed to evaluate immune responses and test therapies against toxins, bacteria, and viruses.

For more information:

FLOW CYTOMETRY & CELL SORTING (FCCS) CORE

Molecular Science Building | 858 Madison Avenue, Memphis, TN 38163

uthsc.edu/research/institutional-cores/fccs/

LABORATORY ANIMAL CARE UNIT (LACU)



The Laboratory Animal Care Unit (LACU) serves all UTHSC animal related research in Memphis, TN, operating several facilities throughout the campus. Our primary focus is to provide high-quality care and housing of study animals. Our program and facilities are accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC). In addition to expertise in animal care and procedures, we offer training to the UTHSC research community. Our veterinary team has created ~40 standard operating procedures and guidelines outlining veterinary standards for many common procedures. These valuable reference documents can also be incorporated when creating IACUC protocols.

SERVICES

Animal Husbandry: Housing, health status, and day-to-day care of research animals. Will assist in special housing and diet/water needs of specific research projects.

Study Procedural Space: All facilities have contained procedure rooms within the vivariums for quick access to your animals and reduced stress from transport.

Technical Services: Project support, collaboration, and fee for service work includes: ear tagging and notching; blood collection; tail vein injections; breeding colony management; anesthesia; surgery; and post-operative care.

Animal Ordering: Obtain animals from approved vendors (e.g., JAX, Charles River, Invotiv), organize domestic and international shipments of rodents between research institutions.

Animal Imaging: Rodent ultrasound (Vevo 2100), digital radiography.

Study Support: IACUC protocol pre-review, study design consultation and troubleshooting, drug dosing, and species-specific training opportunities.

TRAINING

Didactic and hands-on training: available for rodent handling, basic rodent procedures and aseptic surgical technique. Classes are offered 4 times/month in the Coleman animal facility; registration is required.

One-on-one training for specific techniques or surgery: available upon request.

EQUIPMENT AND SOFTWARE

- Vevo 2100 - VisualSonics
- CODA Tail-Cuff Blood Pressure System - Kent Scientific Inc.
- IDEXX BioResearch - Animal health monitoring, histopathology, blood chemistry analysis
- ACAP - Bar-coded card printing and colony management system
- ACIM - Billing, VetCare application systems
- Anprolene - Ethylene oxide sterilization
- Animal Imaging - Digital radiography, Perkin Elmer XMRS (CRB), Xenogen Spectrum (RBL)
- Abaxis VetScanHm5 - Five-part differential hematology analyzer (housed in Rm 269 CRB)

STAFF

Our unit is supported by two clinical veterinarians, one veterinary resident, two veterinary technicians, three supervisors and over 40 additional staff members. Administrative staff provide billing and core unit support. We are available for training, fee-for-service work and collaborations.



**David Hamilton, DVM, DACLAM
Core Director**

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Dr. David Hamilton is the director and attending veterinarian of the LACU. He is professor and chair of the Department of Comparative

Medicine and is the director of the UTHSC residency program in laboratory animal medicine. Dr. Hamilton obtained his Doctor of Veterinary Medicine degree from the Atlantic Veterinary College, University of Prince Edward Island, Canada and subsequently worked in companion animal practice before completing a laboratory animal medicine residency at UTHSC. He became a diplomat of the American College of Laboratory Animal Medicine in 2009. Dr. Hamilton's current position combines administrative duties, regulatory input and oversight, clinical medicine and research.



**Tyler Aycock, DVM
Veterinarian**

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Dr. Tyler Aycock is a clinical veterinarian and an assistant professor in the Department of Comparative Medicine. Dr. Aycock

obtained his Doctor of Veterinary medicine degree from North Carolina State University and subsequently worked in companion animal practice before joining Wake Forest Primate Center as a staff veterinarian. Dr. Aycock joined UTHSC in 2017 and provides primary oversight for the east side of campus.



**Brianne Hibl, DVM, DACLAM
Veterinarian**

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Dr. Brianne Hibl is a clinical veterinarian and an assistant professor in the Department of Comparative Medicine. Dr. Hibl

obtained her Doctor of Veterinary medicine degree from the Atlantic Veterinary College in Prince Edward Island, Canada and subsequently completed a laboratory animal medicine residency at Baylor College of Medicine, Houston Texas. Dr. Hibl joined UTHSC in 2018 and provides primary oversight for the west side of campus. In 2023, she became a diplomat of the American College of Laboratory Animal Medicine.

For more information:

LABORATORY ANIMAL CARE UNIT (LACU)

Coleman Building | 956 Court Avenue, Memphis, TN 38163
uthsc.edu/research/institutional-cores/lacu/



MEDICINAL CHEMISTRY (MEDCHEM) CORE

The MedChem Core supports the acceleration of drug development and research on the UTHSC campuses and in the Memphis area research community by providing consultation and laboratory services in medicinal chemistry, synthetic chemistry, and analytical chemistry.

Synthetic chemistry resources are a necessary cross-cutting platform to support a robust drug discovery and drug development research program. The MedChem Core assists UTHSC investigators in all aspects of small molecule drug development and research, including target validation, lead optimization, tool compound custom synthesis, small scale and multi-gram scale synthesis and purification, structural determination, and purity analysis. The core also provides small molecule qualitative and quantitative analysis, purity analysis, stability analysis, as well as pharmacokinetic (PK) analysis based on LC-MS/MS techniques.

FACILITIES

Our 400 sq. ft. synthetic chemistry laboratory is equipped with chemical fume hoods, balances, heating mantles, stirrers, refrigerators, freezers, Buchi R-300 rotary evaporators with V-300 vacuum pumps, a lab oven, a Labconco Freezone 4.5 Liter Lyophilizer, a Buchi Melting Point M-565, a Discover SP Microwave Synthesizer and a Reveleris PREP Purification System. A Janus robot for high throughput screening was added in FY23.

The MedChem core also has access to the College of Pharmacy shared analytical facility directed by Dr. Wei Li (uthsc.edu/pharmacy/research/analytical-facility.php), which includes NMRs (a Varian Inova 500 and a Bruker Avance III 400), LC-MS instruments (Waters Xevo G2-S QTOF with Waters Acquity UPLC and AB SCIEX TQ5500 with Shimadzu Nexera XR HPLC), and other essential analytical instruments, such as IR spectrometers, UV spectrometers, fluorometers and a polarimeter.

SERVICES

Medicinal and Synthetic Chemistry Platforms

- Target Validation and Drug Design
- Lead Optimization
- Small Molecule Custom Synthesis
- Scale-Up Synthesis and Purification
- Structural Determination by NMR, MS, Elemental Analysis, etc.
- Consultation on any issue related to medicinal chemistry and drug development

Analytical Chemistry Platforms

- Absolute Quantitation of Small Molecules by LC-MS/MS
- Purity and Stability analysis
- Pharmacokinetic (PK) Analysis

STAFF



Jiawang Liu, PhD

Core Director

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Dr. Jiawang Liu earned his BS in Pharmaceutical Science and his PhD in Medicinal Chemistry from Peking University Health Science Center, College of Pharmaceutical Science, Beijing, China. He has over 15 years of experience in drug design, synthesis, and screening, with 60 scientific papers published in peer-reviewed journals.

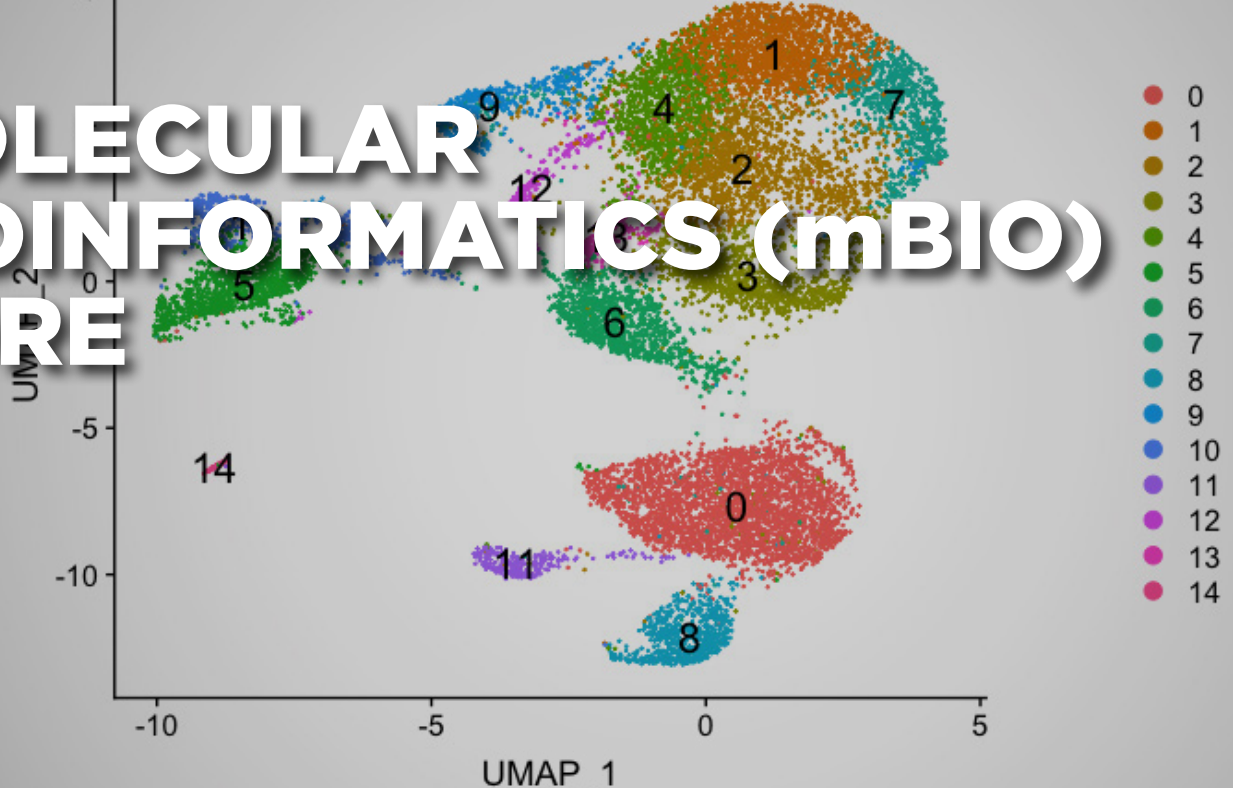
For more information:

MEDICINAL CHEMISTRY (MEDCHEM) CORE

Pharmacy Building | 881 Madison Avenue, Suite 579, Memphis, TN 38163

uthsc.edu/research/institutional-cores/medicinal-chemistry/

MOLECULAR BIOINFORMATICS (mBIO) CORE



The mBIO Core provides the latest technologies, workflows, and standards for analyzing molecular data to researchers on all UTHSC campuses. It complements the services offered at the Molecular Resource Center (MRC), and the Proteomics and Metabolomics Core (PMC) allowing one-stop data generation and analysis.

SERVICES

The mBIO Core offers consultation services during the experiment design phase and performs data analysis after raw data are generated. Services include sequence assembly, sequence alignment, differential expression analysis, and custom software designs. Expertise is also available related to protein structure/function prediction and proteomics/metabolomics.

EQUIPMENT AND SOFTWARE

The mBIO Core maintains four AMD 16-core blade servers to offer researchers the computational power needed to handle the terabytes of next-generation sequencing (NGS) data that is generated every year. Long-term data storage is available as a fee for service. Additional software includes availability of site licenses for Prism statistics software by GraphPad.

The mBIO Core also provides frequent workshops and hands-on training opportunities for PIs, postdocs, and UTHSC students who are interested in learning the software, analysis pipelines, and statistics needed to perform bioinformatics analysis independently.

STAFF



Daniel Johnson, PhD

Core Director

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Dr. Johnson earned his BS in Computer Science and Mathematics, his MS in Computer Science, and his PhD in Molecular

Biosciences at Arkansas State University. He was previously the lab manager for Arkansas State University's bioinformatics program.

He has experience in analysis of microarray data and next-generation sequencing gene expression, including RNAseq, ChIPseq, whole exome sequencing, and in managing and querying electronic medical records.

Dr. Johnson has published multiple papers in the field of bioinformatics, focusing on differential expression analysis and protein structure prediction. He joined the UTHSC team in 2015.

For more information:

MOLECULAR BIOINFORMATICS (mBIO) CORE

Translational Research Science Building | 71 South Manassas, Memphis, TN 38163

uthsc.edu/research/institutional-cores/mbio/



MOLECULAR RESOURCE CENTER OF EXCELLENCE (MRC)

The MRC Core provides molecular technologies for exploring basic biological mechanisms and the molecular basis of human disease. The MRC is a Tennessee Higher Education Commission (THEC) Center of Excellence serving the UTHSC campuses.

The MRC invests in both state-of-the-art equipment and trained personnel. It houses a full range of equipment that facilitates molecular, genetic, and biochemical studies at the sub-cellular and systems biology levels. In addition to providing technical services, MRC personnel assist and instruct investigators in applying specialized tools of modern molecular biology to basic and clinical research.

The MRC's services include sequencing at both the single fragment and whole genome/transcriptome (next-generation sequencing, NGS) levels. Equipment, reagents, and training for real-time PCR and automated isolation of nucleic acids are also provided.

SERVICES

- Nucleic Acid (DNA/RNA) Isolation (Qiagen QIAcube)
- Nucleic Acid Quality Analysis (Quantification and quality determination)
- Sanger Sequencing (Plasmids, fragments and PCR products) via Azenta
- Next-generation Sequencing (ChIP, targeted or whole genome or exome, and microbiome)
- Gene Expression Analysis (Affymetrix microarrays, total RNA and miRNA, ending February 2024)
- Gene Expression Analysis (RNA-Seq; single-cell-Seq)
- Gene Expression Analysis (qRT-PCR and digital PCR)
- Genotyping (Capillary Electrophoresis for STR and SNP analyses)
- Genotyping (qPCR and copy number analysis by digital PCR)
- Genotyping (Next-generation sequencing- targeted and exomes)
- Equipment for Client Use -Robotic Liquid Handler, Multimode Plate Reader, Fluorescence Microscope

EQUIPMENT AND SOFTWARE

- Qiacube Robot (Qiagen RNA/DNA isolation)
- Agilent Bioanalyzers (2)
- Nanodrop 1000 and 8000 Spectrophotometers
- Qubit fluorometer for DNA/RNA quantification
- Illumina NextSeq 2000
- Affymetrix GeneChip System
- Roche LightCycler 480 Systems (2)
- Formulatrix Mantis liquid handler
- Fluidigm Biomark
- Eppendorf epMotion 5075 Liquid Handling Robot
- Spectramax m2e multimode plate reader
- Zeiss Axiophot Microscope
- Hamilton STARlet robot for automated NGS library preparation

Please note: microarray services will be discontinued in February 2024

Samples to be sent to external vendors (Azenta or Transnetyx) must be received by 2:00pm Monday through Thursday.

STAFF



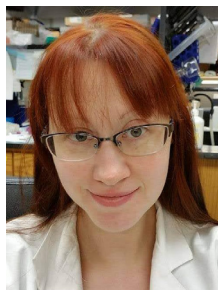
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For more information:

MOLECULAR RESOURCE CENTER OF EXCELLENCE (MRC)

Translational Research Science Building | 71 South Manassas, Memphis, TN 38163

uthsc.edu/research/institutional-cores/mrc/

PROTEOMICS AND METABOLOMICS CORE (PMC)

The Proteomics and Metabolomics Core (PMC) provides state-of-the-art mass spectral technology and support to all UTHSC campuses. It facilitates molecular-level discoveries that transform and advance our understanding of biological systems to solve challenging, relevant scientific questions in the life sciences.

SERVICES

The PMC provides resources for the highest quality mass spectrometry (MS)-based analysis, supporting research needs in the field of proteomics. Services include:

- Consultations to optimize experiment design and to interpret generated data
- Identification of individual proteins in simple and highly complex protein mixtures
- Identification and mapping of post-translational and other modifications of proteins
- Differential protein expression analysis based on precursor ion quantification (SILAC, dimethyl labeling), reporter ion quantification (iTRAQ/TMT labeling), and precursor ion area detection (label-free analysis)
- Analysis of protein-protein interactions, and determination of the molecular masses of analytes

EQUIPMENT AND SOFTWARE

The core is equipped with a **Thermo Orbitrap Fusion Lumos mass spectrometer** - a tribrid mass spectrometer combining a Quadrupole, a Dual Linear Ion Trap, and Orbitrap mass analyzers able to perform CID, HCD, or ETD fragmentation, operate in parallel mode, and provide excellent resolution (500,000 FWHM @m/z 200), accuracy (1 ppm), sensitivity (quantification of 1 attomole at CV<15%), and high scan rate (20 Hz). The instrument operates in line with an ultra-HPLC system- Ultimate 3000RSLC Nano for nano-flow applications or Vanquish for micro-flow applications.

The software tools for system operation/data acquisition and post-acquisition analysis of raw MS data include **Xcalibur/SII 4.3 Proteome Discoverer 2.4, PMI-Preview 3.5, PMI-Byonic 3.5, Compound Discoverer 2.1, Tracefinder 4.1, Lipidsearch 4.1**, and others.

STAFF



David Kakhniashvili, PhD

Core Director

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Dr. Kakhniashvili earned his MS in Chemistry at Tbilisi State University (Rep. Georgia) and PhD in Biochemistry at the Institute of Protein Research of Russian Academy of Sciences. He has multiple publications in the field of proteomics related to red blood cells and sickle cell disease. He joined the UTHSC team in 2015.

For more information:

PROTEOMICS AND METABOLOMICS CORE

Translational Research Science Building | 71 South Manassas, Memphis, TN 38163

uthsc.edu/research/institutional-cores/pmc/



REGIONAL BIOCONTAINMENT LABORATORY (RBL)

The UTHSC Regional Biocontainment Laboratory (RBL) provides facilities and expertise supporting basic research in pathogen biology and translational research to advance discoveries of treatments and vaccines for infectious diseases impacting global health.

FACILITY

The 17,000 sq. ft. RBL provides a unique resource for the CERSI consortium. The main mission of the RBL is to provide leadership and support in the discovery and development of new drugs, vaccines and diagnostics that would protect the general population from emerging and reemerging infectious diseases and bioterrorism. Our facility is approved by the CDC for work with select agents. The RBL provides support for projects requiring biosafety level 2 or 3, but we also provide support for research that does not include infectious agents because of the unique instrumentation and skills of the staff. The staff currently support projects in collaboration with the government, commercial and academic entities (from UTHSC and elsewhere). The RBL is also the site of UTHSC's Center of Excellence in Encephalitic Alphavirus Therapeutics, a \$21 million National Institutes of Health grant to research antiviral treatments for deadly viruses that spread to horses, and people, by infected mosquitoes.

CORE CAPABILITIES

The UTHSC RBL offers state-of-the-art essential services in biomarker discovery, assay development and implementation, small molecule screening, and testing and evaluation of small molecules and vaccines in small

animal models. Instrumentation includes a VEVO3100 (ultrasound), Molecubes CT (computed tomography), Perkin Elmer IVIS (fluorescent and luminescent whole animal imaging) and a UltraMicroscope Blaze for next-generation light sheet imaging, high content imaging, and a LC mass spectrometer.

Broadly, the scope of our animal services include: (1) production and characterization of the pathogens for challenge; (2) determination of optimal route and dose for pathogen challenge; (3) natural history of infection in small animal models; (4) determination of the best indicators of infection and correlates of immunity; (5) development and standardization of non-GLP Animal Models. We also have GLP capabilities in support of *in vitro* and *in vivo* services. A second core capability is providing services supporting biomarker and pathogen discovery from NexGen sequencing to biomarker discovery. The RBL has hematology and clinical chemistry services. Third, the RBL has a complete array of immunology equipment and tools in support of essential questions in inflammation and host response such as a MagPix, Luminex, Cytospin, FACS, and Elispot. Fourth, the RBL is equipped with histopathological instruments and provides services starting from organ collection, processing and embedding, to customized sectioning and H&E staining.

SERVICES AND TRAINING

- Equipment Training
- Training for Work with Select Agents

Please contact the RBL Services Program Manager to discuss your project needs. Contact the RBL Services Coordinator to discuss iLab service requests.

MAJOR EQUIPMENT

- respos®910VET Chemistry Analyzer (RBL-ABSL-3)
- X•pedite™ HEM³ VET Hematology Analyzer (RBL-ABSL-3)
- Agilent Bioanalyzer (RBL-BSL-2)
- Agilent Fragment Analyzer (RBL-BSL-3)
- QuantStudio 6 real-time PCR (96- and 384-well blocks) (RBL-BSL-3)
- Biotek Multiflo FX (RBL-BSL-3)
- Eppendorf PCR (RBL-BSL-3)
- Synergy (RBL-BSL-2; RBL-BSL-3; RBL-ABSL-3)
- Biotek Plate Washer (RBL-BSL-2)
- EnVision Reader (RBL-BSL-3; RBL-BSL-2)
- Luminex® 200 (RBL-BSL-2)
- Magpix® System with Milliplex® Analyst software (RBL-BSL-3)
- KingFisher (RBL-BSL-3)
- Illumina MiSeq (RBL-BSL-2- in select agent space)
- QBIT (RBL-BSL-3)
- Mindray ultrasound system with an Ultrasonic Transducer (RBL-ABSL-3)
- Vevo 3100 Ultrasound (RBL-ABSL-3)
- IVIS Spectrum (RBL-ABSL-3)
- Molecubes CT (RBL-ABSL-3)

PATHOGENS (EXISTING OR ANTICIPATED)

SARS-CoV-1, SARS-CoV-2, MERS-CoV, old and new world hantaviruses, Oropouche virus, Mayaro virus, Venezuelan equine encephalitis virus, Eastern equine encephalitis virus, Western equine encephalitis virus, Madariaga virus, Chikungunya virus, Sindbis virus, Pichinde virus, influenza A viruses, influenza B viruses, Zika virus, West Nile virus, St. Louis Encephalitis virus, human coronavirus

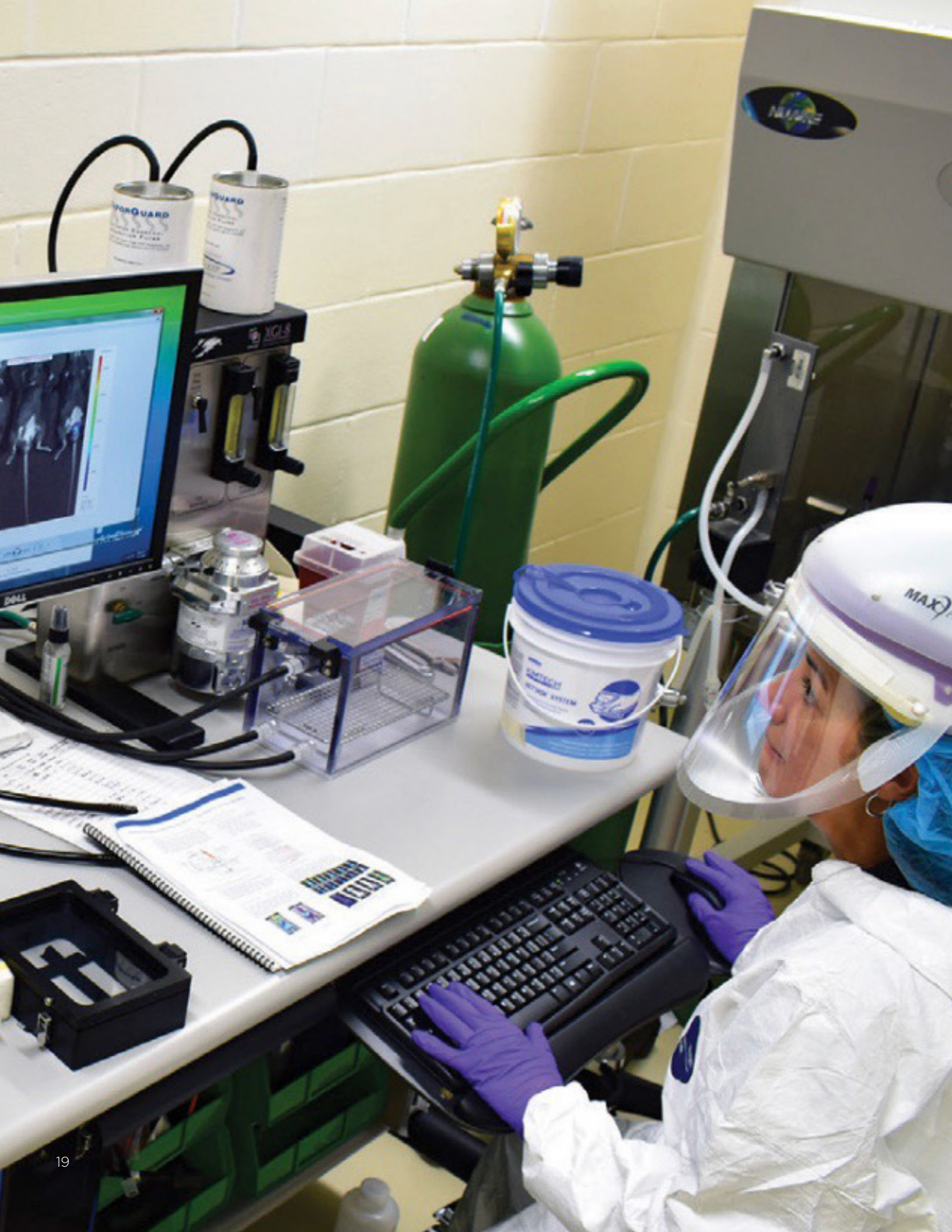
- Miltenyi Biotec BLAZE (RBL-BSL-2- in select agent space)
- Olympus APEX (RBL-BSL-3)
- Yokogawa CQ1 system (RBL-BSL-2- in select agent space)
- EVOS fluorescent microscope (RBL-BSL-3)
- Phase microscopes (RBL-BSL-3)
- Miltenyi Biotec - MACSQuant Tyto Cell Sorter (RBL-BSL-3)
- Cytex Aurora Spectral Cytometer (RBL-BSL-2- in select agent space)
- C.T.L. EliSpot Analyzer (RBL-BSL-3)
- 10 X Genomics Chromium X (RBL-BSL-3)
- Emulate, Inc. - Zoe & Orb (RBL-BSL-3 - currently at BSL-2 as conditions set up)
- AB Sciex, LLC - QTRAP 5500+ mass spectrometer (RBL-BSL-3)
- Leica Microtome (RBL-BSL-2)
- Leica Paraffin Embedding Work Station (RBL-BSL-2)
- Refrigerated Centrifuges with biocontainment rotors (RBL-BSL-3)
- -80°C Freezers (RBL-BSL-3)
- Beadmill Homogenizer (RBL-BSL-3)
- CO2 incubators (RBL-BSL-3)

For more information:

REGIONAL BIOCONTAINMENT LABORATORY (RBL)

901 Monroe Avenue, Memphis, TN 38163

uthsc.edu/rbl/



STAFF



Colleen Jonsson, PhD
Core Director
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Dr. Jonsson is professor and Van Vleet Chair of Excellence in Virology, director of the RBL, and director of the Institute for the Study of Host-

Pathogen Systems at UTHSC. She is the program director for an NIH awarded Center of Excellence for Encephalitic Alphavirus Therapeutics. She has over 28 years of experience in the study of highly pathogenic human viruses represented in more than 169 publications and 5 patents. Her research program focuses on basic and translational research targeting respiratory, encephalitic and hemorrhagic fever viruses. As RBL director she brings a unique blend of professional experience and leadership skills gained from her positions over the past 40 years in industry, academics and not-for-profit institutes. She has led several major cross-institutional, multi-disciplinary efforts funded by NIH, DoD, and NSF in drug discovery and virus ecology/discovery.



Elizabeth Fitzpatrick, PhD
Associate Core Director
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Dong Yang, PhD
RBL Services Program Manager
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RESEARCH HISTOLOGY CORE (RHC)

The Research Histology Core provides high-quality histology services with fast turnaround time to the UTHSC campuses. We support basic and translational research with expert consultation services offered by the Department of Pathology.

The RHC was created in 2017 as a partnership between the Department of Pathology and the Office of Research to provide the UTHSC campuses and the Memphis research community with access to histology services at competitive prices for research specimens.

SERVICES

The RHC offers processing, paraffin embedding, sectioning and staining of research specimens, including H&E-staining, and a wide variety of special stains. Sectioning and staining of pre-embedded frozen sections is also available by appointment. The standard turnaround time is ten business days. Priority processing (3 business days) is also available for a surcharge. Consultation regarding experimental design, including how to gross tissues prior to fixation, how to submit samples for processing and the recommended stains for sectioned materials is available at no cost from the laboratory manager. Expert histopathology consultation services are also offered by referral to the Department of Pathology.

CORE CAPABILITIES

The RHC provides researchers with access to high-quality histology services and to expert consultation on histopathology to support basic and translational research. The RHC supports processing tissue specimens for research purposes, primarily tissues derived from rodent models or human specimens xenografted into mice.

EQUIPMENT

The core maintains the following equipment:

- 1 Thermo Excelsior Tissue Processor
- 2 Sakura VIP Tissue Processors
- 1 Sakura DRS2000 Autostainer
- 3 Leica Microtomes
- 1 Benchmark Special Stains Stainer
- 2 Benchmark Ultra Immunohistochemistry Stainers
- 2 Peloris Rapid Tissue Processor
- 1 CM1850 Cryostat
- 1 Auto Stainer XL (H@E stainer)
- 1 CV5030 Automatic Cover Slipper

SAMPLE SUBMISSION

Samples may be submitted, along with a paper copy of the iLab electronic request form, between 8am-3pm, Monday-Friday to 930 Madison Avenue, Suite 544A. All specimens must be grossed and prepared in well-labeled tissue cassettes prior to submission to the core. PIs are responsible for providing empty slide boxes or slide holders at the time of specimen submission. Cassettes should be labeled with a histology grade pen (StatMark black, SKU code: SMP-BK, www.statlab.com) and pencil.

STAFF

The RHC is staffed by experienced clinical pathology histotechnologists and a full-time laboratory manager. General questions about pricing, turnaround time, procedures for sample submission or special instructions for sample processing should be directed to the laboratory manager.

Upon PI request, expert consultation is available through referral to the Department of Pathology.

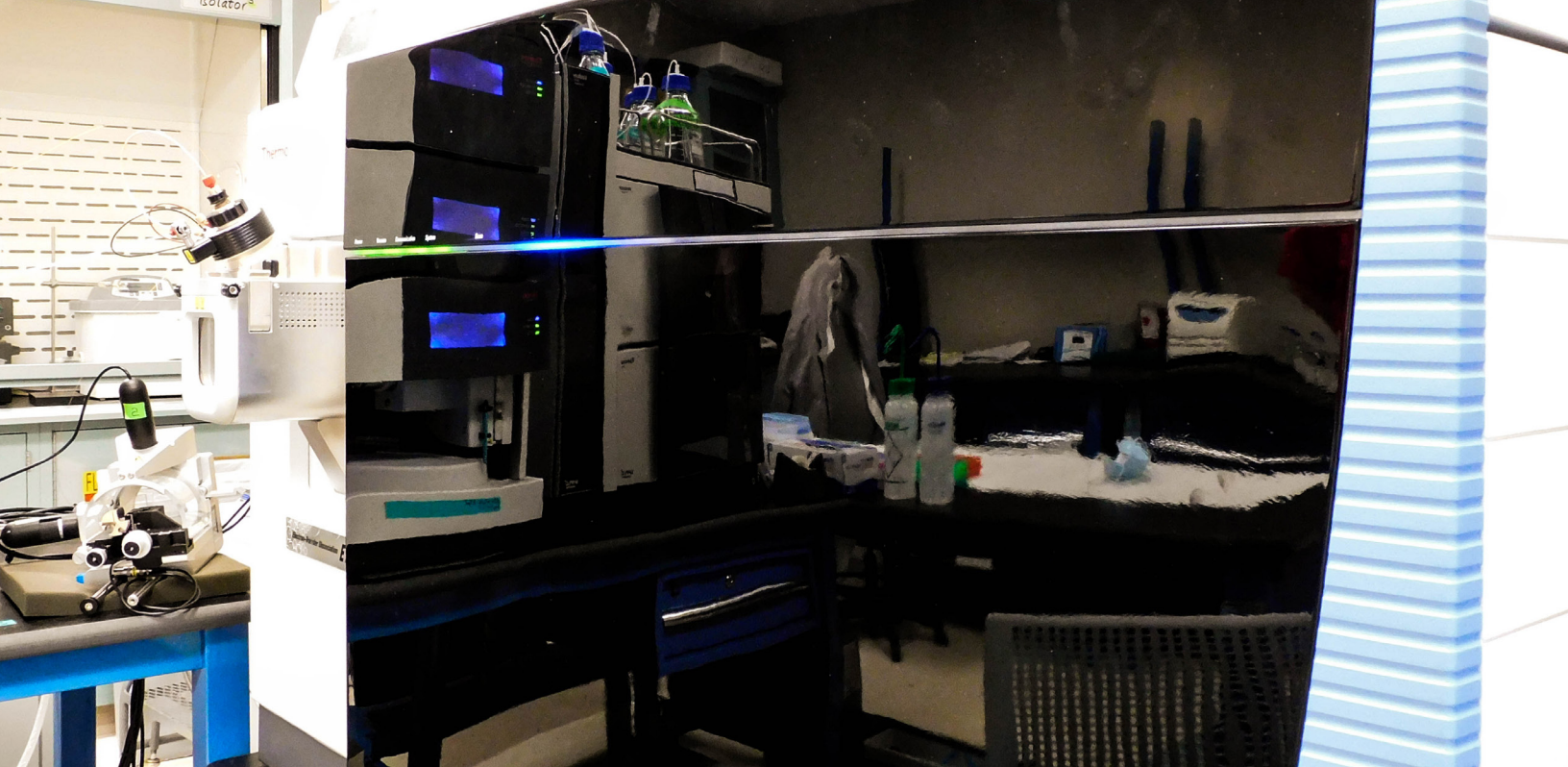
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For more information:

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UTHSC Research Cores and Shared Resources

UTHSC Institutional Research Cores are dedicated to the success of your project. We serve the UTHSC research community by providing access to state-of-the-art equipment and to expert consultation services.

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FOR MORE INFORMATION

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RESEARCH

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