Boilerplate text for

Facilities and Other Resources Attachment

for grant proposals involving investigators in the

Carver College of Medicine at The University of Iowa

Updated: 04/2025

*The information provided in this documented is intended to ease the burden on investigators in coming up with descriptions of the environment and resources available at the University of Iowa, and in particular in the Carver College of Medicine, for performing research. Investigators are encouraged to use the text as a starting point, and to modify and expand as necessary to tailor the information for their specific proposal. Instructions are provided in blue text.*

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# Core Research Facilities and Research Service Units

## Biochemistry Store

[*https://medicine.uiowa.edu/biochemstores/*](https://medicine.uiowa.edu/biochemstores/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

###### Biochemistry Store is a part of the Biochemistry and Molecular Biology Department of the Carver College of Medicine at the University of Iowa. The store serves all University of Iowa research laboratory units, research units of University of Iowa Health Care, the Veterans Affairs Medical Center, University of Iowa students, and any other facilities that have funding through the University of Iowa.

###### Biochemistry Store stocks a almost 2000 items, which include a broad range of research chemicals, labware, glassware, expendables, and other necessary research supplies. The entire catalog of inventory is available on the Biochemistry Store webpage. Personnel also assist customers with finding and ordering speciality items. Purchasing experience and high sales volumes are used to negotiate the purchase of the highest quality inventory at the lowest possible prices.

###### The storeroom window is located in the Bowen Science Building, fourth floor, room 4-321. Hours are Monday-Friday, 9:00 a.m. to 4:30 p.m. Dry ice and liquid nitrogen are available for purchase 24/7 in a self-serve room right next to the store. Biohazard containers are also available across the hall from the storefront, and are self-serve, no sign out is required.

## Biological Safety Level III (BSL3) Laboratories

The Carver College of Medicine's Biological Safety Level III (BSL3) Laboratory facility provides researchers with state-of-the-art laboratories in which to safely study BSL3 select and non-select agents and toxins regulated by both the Centers for Disease Control and Prevention and the U.S. Department of Agriculture. The facility has been designed to safely accommodate research, clinical, and diagnostic procedures, including animal housing areas for rodents and other small animals.  In addition to the animal areas, there are additional individual laboratories to accommodate work for tissue culture, virology, microbiology, and molecular biology. Each of the two facilities allows up to approximately 10 researchers to work simultaneously, which can be reserved using an online reservation system. Prior to using the facility, researchers undergo a rigorous training program and all work is monitored by the Director, the Responsible Officials/Biosafety Officers, and the Carver College of Medicine BSL3 Oversight Committee.

The BSL3 facility laboratories are furnished with all necessary equipment to safely perform tissue culture, virology, microbiology, and molecular biology experiments, including Biological Safety Cabinets, incubators, microscopes, centrifuges, plate readers, shakers, refrigerators, and freezers. The core uses Freezerworks as the inventory management software, which tracks all samples. Additionally, it houses a Zeiss Axiovert 200M inverted fluorescence microscope complete with an environmental chamber, allowing researchers to visualize microbe-host cell interactions and responses in real time. This powerful system provides our researchers with the unparalleled ability to perform a range of microscopy experiments that otherwise would not be possible as all BSL3 samples must be inactivated prior to removal from the laboratory.

## Biomedical Research Store

[*https://webapps1.healthcare.uiowa.edu/biostore/*](https://webapps1.healthcare.uiowa.edu/biostore/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Biomedical Research Store provides University of Iowa research investigators easy procurement of common molecular biology enzymes, reagents, and nucleic acid purification kits. The store also stocks tissue culture reagents, including media, serum, and supplements. Large volume contracts enable the store to negotiate very low prices as well as eliminate all shipping and packaging fees.

## Biostatistics Consulting Center

[*https://www.public-health.uiowa.edu/biostatistics-consulting-center/*](https://www.public-health.uiowa.edu/biostatistics-consulting-center/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Biostatistics Consulting Center is a unit within the Biostatistics Department of the College of Public Health. The Biostatistics Consulting Center experts provide statistical consulting for researchers in the Carver College of Medicine, as well as other health science researchers at the University of Iowa Colleges of Dentistry, Nursing, Pharmacy, and Liberal Arts and Sciences. The Center assists researchers with all phases of basic science, clinical, and epidemiologic research. Specifically, the Center can assist with grant proposal development and study design, develop efficient data management strategies, perform appropriate statistical analysis, and assist in writing reports for scientific publication.

## Center for Biocatalysis and Bioprocessing (CBB)

[*http://cbb.research.uiowa.edu*](http://cbb.research.uiowa.edu)

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The CBB is an interdisciplinary research center dedicated to the advancement of biocatalytic sciences. The Center operates a core Microbial Bioprocessing Facility that provides expertise in both upstream and downstream bioprocesses to: a) optimize production of highly-valued biomolecules, b) scale-up bench-top processes to commercial sizes, and c) perform pilot-scale manufacturing of products at the highest level of quality control. Examples of targeted products include vaccines, enzymes, binding proteins, growth hormones, DNA, RNA, and bio-transformation products. Conventional academic biomanufacturing is performed in our Research and Process Development (RPD) suite. A distinguishing feature of the CBB core facility is the operation of a second suite that focuses on production under current good manufacturing practices (cGMP) conditions. This GMP suite offers the preparation of high quality biotechnology products produced under regulations defined by the 2008 FDA guidance for the biomanufacturing of Phase 1 investigational drugs. The information provided by the GMP manufacturing of experimental therapeutics is suitable for Investigational New Drug (IND) applications. Fermentations can be scaled up from shake flasks to 1000 L volumes within our RPD suite and up to 100 L volumes in our GMP suite. All biomanufacturing processes are performed by professional staff trained using SOP-driven laboratory practices and high quality control.

## Central Microscopy Research Facility (CMRF)

[*https://cmrf.research.uiowa.edu*](https://cmrf.research.uiowa.edu)

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The CMRF is supported, in part, by the Holden Comprehensive Cancer Center and offers a wide variety of research services, educational/training opportunities, and instrumentation at its facility in the Eckstein Medical Research Building within the Carver College of Medicine. It specializes in biomedical imaging and offers epi- and confocal fluorescence microscopy as well as scanning and transmission electron microscopy. The CMRF also provides all the instruments and materials for routine histological processing, staining, and visualization for both frozen and aldehyde-fixed tissue. CMRF instrumentation includes a Leica SP8 STED super-resolution confocal microscope, Zeiss LSM 710 and LSM 980 confocal microscopes, a Leica TIRF microscope, and an Olympus inverted epifluorescence microscope with motorized X-Y-Z stage and environmental chamber for multi-ROI time-lapse microscopy. The CMRF also has a complete repertoire of instruments and services for electron microscopy including specialized staining and embedding techniques, negative staining, metal coating, and cryo-fixation for analysis with a Hitachi HT-7800 TEM. A Hitachi S-4800 FESEM is available for high-resolution imaging of sample surfaces. In addition, the CMRF maintains licenses and expertise in data analysis with the Bitplane Imaris 3D analysis software, Huygen’s deconvolution software, and Fiji/ImageJ open-source package. The CMRF supports both the experienced and novice investigators and provides training for independent use of resources. Alternatively, all or parts of a project can be handled by the staff.

## Comparative Pathology Laboratory (CPL)

[*https://cpl.lab.uiowa.edu*](https://cpl.lab.uiowa.edu)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The CPL is a research core that helps investigators with their handling and analysis of research tissues. The CPL expertise includes Dr. David K. Meyerholz DVM, PhD, DACVP (Director) and Thomas Businga BS, MS (Research Associate), who provide decades of experience in anatomy, pathology, and tissue handling techniques. The facility provides routine to specialized tissue handling services from prosection, necropsy, fixation, and morphologic analysis with access to histotechnology services, immunohistochemistry, and physician pathologists specialized in a wide-range of organs and tissues.

## Developmental Studies Hybridoma Bank (DSHB)

[*http://dshb.biology.uiowa.edu*](http://dshb.biology.uiowa.edu)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The DSHB is a national resource created by the NIH in 1985 and housed at the University of Iowa. The DSHB stores and distributes hybridomas and the monoclonal antibodies (mAbs) they produce at cost to the general scientific community in order to facilitate scientific research. Our priorities are to 1) allow researchers to test multiple mAbs without commitment of significant funds, and continue to utilize those of interest without worry of expense; 2) relieve scientists of the time and expense of distributing hybridomas and mAbs they develop; and 3) assure the scientific community that mAbs with limited demand remain available. The DSHB has over 5,000 hybridomas and recombinant antibodies obtained from a variety of individuals and institutions, including the NIH Protein Capture Reagent Program, the National Cancer Institute, the European Molecular Biology Laboratory, and the Muscular Dystrophy Association. The DSHB distributes over 65,000 samples per year to investigators around the world. University of Iowa investigators do not pay shipping costs and receive expedited on-campus distribution.

## Electron Spin Resonance Facility

[*https://www.healthcare.uiowa.edu/CoreFacilities/esr/*](https://www.healthcare.uiowa.edu/CoreFacilities/esr/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Electron Spin Resonance Facility provides expertise and instrumentation to pursue research questions dealing with oxygen free radicals, singlet oxygen, nitric oxide, and the array of related oxidants and antioxidants that influence the overall redox environment of cells, tissues, and whole organisms. To achieve these goals the facility houses two Bruker EMX ESR Spectrometers: a Sievers NOA 280i (for nitric oxide questions), a Seahorse XF Pro with BioTek Cytation 1 image analysis system (to address fundamental metabolism), and complementary UV-Vis and fluorescent spectrometers. The facility also provides investigators with many protocols to rigously address questions in redox biology (e.g., oxygen uptake, detection of superoxide and H2O2, quantitation of vitamin C, enzyme activity (GPx), and lipid oxidation products), and routinely shares our experience in successfully performing research experiments in the area of quantitative redox biology.

## Emergency Department Research Enroller Program (ED-REP)

[*https://medicine.uiowa.edu/biochemstores/*](https://medicine.uiowa.edu/biochemstores/)

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The ED-REP was established in 2015 with combined support from Department of Emergency Medicine and the Carver College of Medicine and provides the infrastructure for enrolling emergency department (ED) patients in clinical studies. The goals of the ED-REP are to: (1) conduct high quality clinical acute care research and (2) facilitate future funding for ED-based research projects (grant-funded and industry-funded). ED-REP enrollers have experience recruiting for many different types of projects, ranging from investigator-initiated pilot studies and public health surveillance projects, to grant and industry-funded research, including clinical trials, biomarker studies, mechanistic physiology studies, and surveys. Enrollers recruit potential participants and screen them for study eligibility, obtain informed consent, establish data collection procedures, follow-up with study participants, and abstract data from medical records.

## Flow Cytometry Facility

[*medicine.uiowa.edu/flowcytometry*](http://medicine.uiowa.edu/flowcytometry)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The 1,200-square foot Flow Cytometry Facility is supported, in part, by the Holden Comprehensive Cancer Center and is located in the Eckstein Medical Research Building (EMRB). The facility has one magnetic-based and nine laser-based instruments whose major purpose is the identification and isolation of cell populations. The two cell sorters are the Cytek Aurora CS (spectral) and the Becton Dickinson FACS Aria Fusion (conventional), which both operate in a biological safety hood allowing sorting of live human cells and cells exposed to infectious agents. The facility also has three Becton Dickinson LSR II instruments for multi-color flow cytometry analysis, a Miltenyi autoMACS, a Becton Dickinson Accuri C6, two five-laser Cytek Auroras with 96-well plate readers, and an Amnis ImageStreamX MkII imaging cytometer. The cell sorters are operated by dedicated technicians M-F, 8am-6pm and other instruments are available 24/7 upon suitable training. The facility provides scientific and technical personnel who are available for consultation in designing experimental protocols and training in the use of bench-top instruments and software programs for the interpretation and analysis of data. Cell preparation protocols are available on the facility’s website and publication quality output is available upon request. Offline data analysis using SpectroFloTM, FlowJoTM, DiVaTM, IDEASTM, and ModFITTM is accomplished through the facility's system of networked computers equipped with correspondingly maintained licenses. Data are also accessible remotely through the facility's dedicated file servers, which provide data storage for at least ten years. The facility also supports a university-wide FlowJoTM site license for data analysis in individual labs.

## Genome Editing Facility

[*https://medicine.uiowa.edu/genomeediting/*](https://medicine.uiowa.edu/genomeediting/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Genome Editing Facility provides centralized instrumentation and expertise for the generation, breeding and analysis of both genetically engineered and gene-targeted mice. The facility is comprised of four personnel trained in a variety of mouse embryo manipulations for producing genome-engineered mice. This includes transgenesis and CRISPR/Cas9-based gene editing using pronuclear microinjection. Additional services include the design and validation of genetically engineered constructs and CRISPR/Cas9 reagents, screening of founder animals, mouse colony genotyping, and backcrossing strains. The facility also provides services and storage for embryo and sperm cryopreservation, as well embryo and mouse re-derivation and *in vitro* fertilization of cryopreserved sperm. The facility performs mouse embryonic stem cell evaluation, expansion and injection into blastocysts. The facility maintains all animals in strict specific pathogen free (SPF) barrier conditions and has three wet laboratories, a microscopy suite, a tissue culture room, and a molecular biology laboratory. The facility currently has a 100% founder success rate with nearly 300 different constructs.

## Hardin Library for the Health Sciences

[*https://www.lib.uiowa.edu/hardin/*](https://www.lib.uiowa.edu/hardin/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

Hardin Library for the Health Sciences is located in the center of the University of Iowa health sciences campus and is part of the University of Iowa Libraries. It supports all health sciences students, faculty, and staff on the University of Iowa campus and serves as the clinical and research library for University of Iowa Health Care. Hardin Library provides print and electronic resources, computers and computer classrooms, and study and relaxation space. Hardin Library is also home to the NIH-funded Network of the National Library of Medicine (NNLM) Region 6 office and the NNLM All of Us National Program Center.

As the only health sciences research library in the state, Hardin maintains a comprehensive collection, with the majority of current books and journals available electronically. Much of the older print material is housed in the University of Iowa Libraries Annex and can be delivered to users as needed. Users also have access to a wide variety of databases and other electronic resources, including PubMed, CINAHL, Embase, Web of Science, Scopus, ClinicalKey, AccessMedicine, Dynamed, and hundreds more.

Hardin librarians take part in the curricula of all health sciences colleges and are available to consult with students, faculty, residents, researchers, and others on locating the information they need. Hardin librarians have received specialized training on supporting systematic reviews, metanalyses, and other comprehensive searches.

## High Resolution Mass Spectrometry Facility (HRMSF)

[*http://hrmsf.research.uiowa.edu/*](http://hrmsf.research.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The HRMSF is one of the Core Research Facilities under the Office of the Vice President for Research and is housed in the Chemistry Building. The facility provides state-of-the-art chromatographic and mass spectrometry services for researchers across campus, Iowa, and the nation. The HRMSF employs both gas and liquid chromatography mass spectrometry (GC-MS and LC-MS) techniques to assist researchers in confirming and characterizing new compounds and natural products; in performing LC-MS/MS techniques to study drug metabolism, pharmacokinetics, and targeted quantitative analysis; and in utilizing our ultra-high resolution mass spectrometer for discovery and untargeted screening to answer a variety of biological and environmental questions. We consult with investigators to determine their goals and facilitate the use of our mass spectrometric services to answer their research questions. HRMSF personnel provide education on GC-MS, LC-MS, and tandem mass spectrometry (MS/MS) methods, and on a number of software packages for data interpretation and mining. The HRMSF maintains licenses and expertise for Waters MassLynx, Thermo Tracefinder and Compound Discoverer, and Agilent Mass Hunter software programs. Staff is available to handle all aspects of a project or can provide training for independent use of HRMSF instrumentation. Specific instrumentation includes the following:

1. an Agilent 7250 GC/Q-TOF high resolution mass spectrometer with a 8890 GC and 7693 autosampler used for molecular weight and elemental composition determination, structure characterization, and GC-MS quantitation;
2. a Waters Acquity TQ-S Cronos triple quadrupole mass spectrometer with an Acquity H Class UPLC used for quantitative analysis of complex mixtures using multiple reactions monitoring (MRM) scanning techniques;
3. a Thermo high-resolution Q Exactive hybrid quadrupole-Orbitrap mass spectrometer with a Vanquish UHPLC system used for high-resolution LC-MS and MS/MS to identify unknowns in complex mixtures, targeted screening, and quantitative analysis.

## High Throughput Screening Facility (HTSF)

[*https://hts.research.uiowa.edu*](https://hts.research.uiowa.edu)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The HTSF provides a high-throughput platform that integrates robotics, detection systems, and chemical/biologic libraries to enable highly flexible screening services, project management, grant assistance, and assay/technology development for investigators at the University of Iowa. Instrumentation systems allow for scalable screening approaches for drug discovery and development through screening of large chemical/biologic libraries and also facilitate molecular probe discovery for mechanism of action studies of chemical biology by screening focused and intellectually-designed compound collections. It is an *in vitro* plate-based platform for unbiased systematic research, e.g., systems cancer biology, microbiology, pharmacology, and others.

The HTSF is equipped to perform high-throughput screening in 96, 384, and 1536-well formats with plate reader detection (Perkin-Elmer EnVision) using absorbance, fluorescence, and luminescence, including advanced FRET and BRET techniques. The HTSF is also equipped to perform high-content screening (Perkin Elmer Operetta Confocal Imaging System) to detect and quantify phenotypic changes, i.e., cell differentiation, cell migration, neurite outgrowth, and target trafficking; or by fluorescence intensities for target protein expression, transcription factor, or signaling pathway analysis. High throughput screening and high content screening systems are integrated with robotics for plate handling and assay execution, suitable for small- or large-scale compound library screens that are fully automated.

The HTSF holds both small molecule drug libraries and biological libraries. Current small molecule libraries include: 1) an FDA-approved drug library containing 1,018 compounds that is primarily used to identify drugs that can be repurposed; 2) a pathway or target selective collection (PTSC) containing 1,310 compounds for mechanism interrogation; 3) the Spectrum Library from MicroSource (MSSP) containing 2,320 structurally diverse compounds, including marketed and experimental drugs as well as natural products, which is typically the starting point of pilot screenings; 4) ChemBridge, the Diverset, a collection of 50,000 small molecules representing a wide swath of chemical space, optimized to be “drug like,” considering factors such as partition coefficient and Lipinski-like rules; 5) Maybridge Ro3 Diversity Fragment Library containing 1,000 carefully selected fragments for the optimal balance between broad coverage of lead-like diversity space and the number of fragments; and 6) the NIH NCI NExT collection of 83,536 small molecules, which is a general screening set that was designed to identify lead compounds for drug discovery projects. It is comprised of three non-separable subsets of the Legacy molecular library small molecule repository (MLSMR), 15 privileged scaffolds in two Diversity subsets. In addition, a natural products fraction collection from the NCI of ~320,000 fractions (part of NCI Moonshot program) is also available. Biological libraries cover the cell collections of melanoma cell lines and breast cancer cell lines, and arrayed Kinome-wide CRISPR gRNA library from Integrated DNA Technologies.

## Human Immunology Core (HIC)

*<https://humanimmunology.sites.uiowa.edu>*

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The HIC is supported, in part, by the Holden Comprehensive Cancer Center and provides services that analyze immune cell activation and phenotypes from human samples. The goal of the HIC is provide logistical support to clinical investigators needing immune correlative studies for clinical trials or translational investigators examining immune phenotypes in human samples. The HIC provides consultation on experimental design and development of flow cytometry panels and provides letters of collaboration and support for grant submissions for no cost. The HIC works closely with the Tissue Procurement Core to facilitate specimen acquisition, processing and storage. A main experimental technique used by the HIC is high parameter flow cytometry analysis of human immune cell phenotypes. The HIC has validated several panels for immune cell analysis, including a 40-color PBMC panel, a 30-color T cell phenotype panel, a 21-color T cell activation panel, and a 30-color B cell phenotype panel. The HIC also uses single-analyte ELISA or multiplex assays to measure the production of cytokines, chemokines, and other proteins by immune cells. Other immune cell panels and techniques are currently being validated. All techniques are provided for a fee-for-service and include sample processing, data analysis and production of publication quality data. In the Spring/Summer of 2025, the HIC will begin offering Chip Cytometry services using the Canopy Cellscape. This will allow users to explore a high number of parameters within tissue sections.

## Information Technology Services (ITS)-Research Service

*Formerly High Performance Computing (Research Services)*

[*https://research.its.uiowa.edu/*](https://research.its.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

ITS-Research Services is the primary support organization for advanced research computing on the University of Iowa campus. ITS-Research Services is comprised of Senior Director Joe Hetrick, Associate Director Melissa Lawrence, thirteen full time technology professionals, and three student employees. ITS-Research Services also leverages the services and expertise of the full ITS organization, which is composed of over 400 technology professionals. Primary research computing services and resources are as follows:

High-Performance Computing.The Argon condo cluster is the primary high-performance computing resource on the Iowa campus and has the following features:

* ~25,000 processor cores
* 400 TB of scratch storage
* 1 TB of home account storage per user
* Omnipath & Infiniband – 400 Gb/s network
* 700 Compute Nodes
  + 128GB-1.5TB per node
  + Up to 64 cores per node, Xeon E5-2680v4, 6230, 6430
  + 3 TB local SSD
* CentOS 7
* 450 NVidia Graphics Accelerators
* Data analysis software (R, Python, Perl, and many more discipline-specific applications)

The University of Iowa also has access to the Advanced Cyberinfrastructure Coordination Ecosystem: Services and Support (ACCESS) and is a founding member of the Great Lakes Consortium for Petascale Computing.

Cloud Computing.The University of Iowa has contracts in place with both Amazon Web Services and Microsoft Azure that provide access to cloud services.

Data Storage.The research data storage service provides:

* 5 TB of data storage at no charge per lab
* CIFS or NFS access

Storage is secure, includes continuous data integrity checks, is backed up to an offsite facility, and has optional audit trails available to support sensitive data. ITS-Research Services also currently manages more than 20 PB of large-scale data storage systems that are accessible from high performance computing resources. These systems have optional backup to a remote facility, can accommodate file systems from 1-400 TB, and are available to all campus researchers for an annual per terabyte fee of $35/TB per copy of data. Data on storage systems managed by ITS-Research Services can be shared via the Globus data sharing platform.

Data Centers.ITS-Research Services has reserved data center space to support the needs of the research enterprise. This includes:

* Three geographically distinct data centers
* 98 racks of data center space
* Over 1 MW of power and cooling

Networking.ITS-Research Services provides high-speed networking both on and off campus.

* 1 Gb standard desktop network connections
* 10 Gb networking to buildings and data centers
* 120 Gb Internet access via BOREAS and Internet2

Interactive Data Analytics. ITS-Research Services provides an interactive data analytics environment, which allows the use of Jupyter and RStudio environments for researchers working in this space.

Consulting and Training. ITS-Research Services provides consultation and training to researchers to help them solve technology challenges and has consultants with experience in the following areas:

* Data analysis and platform provisioning
* Data science and analytics
* Grant collaboration
* High-performance and high-throughput computing
* Large-scale data transfer
* Server provisioning
* Customer Application and Web development
* Compliance (security plans for FISMA, HIPAA, NIST, DFARS, internal security requirements, data management plans for NIH/NSF, etc.)

## Iowa Institute of Human Genetics (IIHG): Bioinformatics Division

[*https://medicine.uiowa.edu/humangenetics/research/bioinformatics-division*](https://medicine.uiowa.edu/humangenetics/research/bioinformatics-division)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Bioinformatics Division of the IIHG provides the expertise and computational resources to analyze complex DNA and RNA sequencing datasets. Routine analysis includes evaluation of large-scale sequencing experiments, such as variant calling from research and clinical exomes or targeted panels, quantitation and statistical evaluation of data from \*-seq experiments (*e.g.,* RNA-Seq, ChIP-Seq, ATAC-seq, Methy-DIP-seq), as well as single-cell and Visium spatial transcriptomics from 10x Genomics. Staff members have diverse training in biological data analysis, and are available to work with investigators on short-term projects, grant applications, and longer-term research collaborations. The Bioinformatics group has preferred access to 14 nodes of on-campus, high-performance computing with high-bandwidth dedicated storage attached to the clusters. They maintain a private, CAP- and HIPAA-compliant clinical Galaxy installation for the evaluation of clinical NGS data for the IIHG’s popular “KidneySeq” test. The group also maintains a public-facing Galaxy installation for University of Iowa researchers and licenses for analysis software including Ingenuity Pathway Analysis, iPathwayGuide, Partek Flow, and Partek Genomic Suite. The Bioinformatics group provides educational resources for researchers looking to process and analyze their own data with standard computational techniques. These include workshops that offer hands-on tutorial sessions that focus on different introductory topics and video tutorials on the IIHG YouTube channel.

## Iowa Institute of Human Genetics (IIHG): Genomics Division

[*https://medicine.uiowa.edu/humangenetics/genomics-division*](https://medicine.uiowa.edu/humangenetics/genomics-division)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Genomics Division of the IIHG is supported, in part, by the Holden Comprehensive Cancer Center and University of Iowa Intellectual and Developmental Disabilities Research Center (Hawk-IDDRC) to provide a broad spectrum of technologies and resources to support nucleic acid- and genomics-based initiatives to the research and clinical communities. The Genomics Division also provides educational support in the form of scientific seminars and mini-syposiums focused on genomics-based technologies and resources. The technologies provided by the Genomics Division include:

* Genome Sequencing: Next-generation sequence data are provided with an Illumnia NovaSeq 6000 short-read genome sequencer that features dual-flow cells (delivering the highest throughput and lowest price-per-sample across multiple applications), a MiSeq benchtop sequencer that permits low throughput genome sequencing, and the Oxford Nanopore Technologies long-read platform that typically delivers sequencing reads of 5 kb-40kb (or longer). These sequencing platforms are complemented by a Covaris E220 96-well plate sonicator, SciClone, and EpMotion liquid handling robots that facilitate high-throughput sample preparation.
* Single-Cell and Spatial Transcriptomics Analysis: Two 10X Genomics Chromium X drop-seq-based technology systems used are for single-cell/nuclei sequencing applications including expression profiling, immune cell V(D)J enrichment, and ATAC-Seq. In collaboration with the Iowa Neuroscience Institute, spatial transcriptomic analyses are provided using the 10X Genomics Visium platform from frozen fresh or FFPE tissue blocks provided by the investigator.
* Custom oligonucleotides and synthetic DNA: Oligonucleotides are provided via a commercial vendor (Integrated DNA Technologies (IDT)) to University of Iowa investigators. Investigators submit their oligonucleotide requests through the Genomics Division via a portal that links directly to IDT to permit all synthesis options and a 24-hour turn-around.
* DNA Sequencing: Sanger-based DNA sequencing is provided with two Applied Biosystems Models 3730xlu (96-capillary) DNA sequencers. Sequence data are accessed by investigators via a custom online web system.
* DNA Microarray: Array-based genotyping and methylation profiling are provided with the Illumina iScan BeadArray system.
* Nucleic Acid quality assessment: DNA and RNA quality and quantity can be assessed using a variety of systems including Bioanalyzers, TapeStations, Fragment Analyzer, Qubit fluorometers, and Trinean and Nanodrop spectrophotometers.
* Quantitave DNA/RNA Analysis: For real-time PCR analysis, the facility has ABI QuantiStudio Flex 7 and ABI QuantStudio 7 Pro instruments and supports array card, 96- and 384-well formats. Digital PCR is provided with a BioRad QX200 droplet digital PCR system, enabling ultrasensitive and absolute quantification of nucleic acid targets. The facility also provides access to the NanoString nCounter MAX system. The NanoString platform uses an amplification-free technology to measure RNA or DNA content by hybridizing fluorescently color-coded barcode-labelled probes to the target molecules and directly counting the number of probes of each barcode that binds to its target. The platform can be used for gene expression, microRNA profiling, and copy number assessment studies.

## Iowa NeuroBank Core

[*https://inbc.medicine.uiowa.edu/*](https://inbc.medicine.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Iowa NeuroBank Core in the Iowa Neuroscience Institute provides biobanking and spatial multi-omics program services to support biomedical research. The NeuroBank Core is located on the third floor of the Medical Research Facility. Biospecimen collections include human neurosurgical tissue, postmortem brain tissue, and body fluids. The NeuroBank Core also provides fibroblasts and induced pluripotent stem cells (iPSCs) to facilitate stem cell research and human disease modeling. All of the human specimens are de-identified and associated with clinical records via University of Iowa BioShare/Labmatrix. The NeuroBank Core also provides educational support for undergrad research, STEM outreach events, scientific seminars, mini-syposiums, and hands-on bootcamps.

In addition to biobanking, the Iowa NeuroBank Core offers specialized instrumentation and scientific services for extensive molecular analysis.

* Visium spatial transcriptomics (10X Genomics): the Visium assays offer an unbiased map of whole transcriptomics in tissue sections. The Visium CytAssist instrument system transfers transcriptomic analytes from pre-sectioned and pre-stained tissue samples on standard glass slides to deliver spatial mapping at 2x2 micron squares.
* MERSCOPE (Vizgen): The MERSCOPE platform provides *in situ* transcriptomic imaging data of targeted proteins and RNA in tissue sections and cell cultures at single-cell and sub-cellular resolution.
* PyroSequencing (Qiagen): The facility provides access to the PyroMark Q48 AutoPrep sequencer and software for advanced DNA methylation, mutation, and SNP quantification. Pyrosequencing has several unique features, including 1) sequencing-by-synthesis methods, 2) single-base specificity throughout the genome for lower costs than traditional or targeted sequencing, and 3) advanced software support in designing primers and analyzing the data.

## Iowa Neuroimaging Processing Core (INPC)

[*https://neuroimaging.uiowa.edu/*](https://neuroimaging.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The INPC aims to foster growth and rigor in neuroimaging projects and collaborations by providing image processing services to support biomedical research that utilizes magnetic resonance imaging (MRI) at the University of Iowa.The INPC maintains, adapts, and develops cutting-edge neuroimaging tools and methods that enable interdisciplinary research teams to access neuroimaging results effortlessly and efficiently. INPC services focus on a few critical components to all MRI studies such as cleaning the images, assessing the quality of images, extracting biologically- and research-relevant information, and applying statistical models to test research hypotheses. The services are standardized and customizable, and include quality assurance. The INPC team includes experts in image analysis and modeling, data management, financial services, and research/project management. The team leverages the computing power of the University of Iowa’s High Performance Computer cluster Argon to deliver results in a timely manner on datasets of all scales. The INPC provides this support on a fee-for-service basis.

## Magnetic Resonance Research Facility (MRRF)

[*https://medicine.uiowa.edu/mri/*](https://medicine.uiowa.edu/mri/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The MRRF at the University of Iowa is dedicated to providing MR imaging equipment and expertise to any researcher. Two field strengths are available (3T and 7T). The MRRF currently supports more than 60 research imaging projects from fourteen different departments representing five colleges within the University of Iowa.

The MRRF currently has two research-dedicated whole-body MR scanners (GE Premier 3T, GE Signa 7T) for human and large-animal imaging, a head-only MR scanner (GE MAGNUS 3T), and one small-animal MR scanner (7.0T GE MR901) available for research purposes. The whole body scanners are fully outfitted for fMRI imaging, including stimulus presentation software (E-Prime, Presentation, Matlab), auditory and visual stimulus hardware (Avotec), and physiological monitoring (Biopac). Additionally, an MRI Simulator is available to all researchers.

The MRRF utilizes the XNAT system for data archiving and for distribution of images to the various research projects. In addition, the facility is outfitted with a number of image analysis tools, including FSL, AFNI, 3D Slicer, ImageJ and BRAINS. The facility also has the ability to develop custom MR pulse sequences and reconstructions using the GE Epic and orchestra tools, respectively.

## Materials Analysis, Testing, and Fabrication Facility (MATFab)

[*https://matfab.research.uiowa.edu/about-matfab-facility*](https://matfab.research.uiowa.edu/about-matfab-facility)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The MATFab is a user facility that houses a suite of instrumentation for chemical and elemental analysis, imaging, metrology, and micro- and nanofabrication. MATFab occupies approximately 4000 sqare feet of space across 5 laboratories (170, 172, 174, 196, and 198) on the first floor of the Iowa Advanced Technology Laboratories building, which is among the highest quality research space available anywhere in the country. Two of the laboratories house materials characterization instruments and a third contains wetbench and hood space for sample preparation. Characterization instrumentation include electron microprobe, two scanning electron microscopes (SEM), high-resolution inductively coupled plasma mass spectrometry (HR-ICP-MS),inductively coupled plasma mass spectrometry (ICP-MS) inductively coupled plasma optical emission spectroscopy (ICP-OES), Raman spectroscopy paired with an optical microscope, combustion elemental analyzer, Brunauer-Emmitt-Teller (BET) analysis, thermogravimetric analyzers (TGA), Micro computed tomography (CT), spectroscopic ellipsometer, 3-D profiling, X-ray fluorescence spectroscopy, and three X-ray diffractometers. Sample preparation capabilities include a microbalance, fume hoods for acid dissolution, and a microwave digestion system. Our fabrication facility is housed in 1500 square feet of clean room space, and has deposition and etching tools for building small structures at the micro and nanoscale, with applications in LEDs, semiconductors, and microfluidics. Fabrication equipment includes electron beam nanolithography system, nanoimprint system, mask aligner, e-beam evaporator, sputterer, and plasma etching equipment. The facility is currently staffed by four full-time staff members and additional part-time support personnel who oversee instrument operation, routine maintainance, user training, and consult on data analysis. It is managed by a faculty director and financially suppported by the University of Iowa Office of the Vice President of Research, College of Liberal Arts and Sciences, College of Engineering, and external funding sources.

## Metabolic Phenotyping Core

[*https://medicine.uiowa.edu/diabetes/metabolic-phenotyping-core*](https://medicine.uiowa.edu/diabetes/metabolic-phenotyping-core)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Metabolic Phenotyping Core provides investigators with specialized and non-invasive metabolic assays to phenotype cells, tissues, and animal models related to diabetes, obesity, other metabolic disorders, and their related complications.

The central services of the core include:

* Determining whole animal energy expenditure using Promethion metabolic cages (Sable Systems International). This is a non-invasive measurement of food intake, water intake, energy expenditure, respiratory exchange ratio, body weight, and physical activity.
* Measurement of food intake, water intake, fecal and urine output with Techniplast metabolic cages.
* Core body temperature measurement.
* Thermoneutral housing using Solace Zone Heated IVC 32-cage system and temperature-controlled housing (6-40°C) using a Powers Scientific rodent incubator.
* Measuring whole body composition with a Bruker MiniSpec for mice.
* Hyperinsulinemic-euglycemic clamp experiments to assess *in vivo* insulin action, insulin signaling, and glucose metabolism in awake mice.
* Hyperglycemic clamp experiments to assess *in vivo* pancreatic beta-cell function (i.e., glucose-induced insulin secretion) and the effect of hyperglycemia on glucose metabolism (i.e., glucose toxicity).
* Mitochondrial bioenergetics: tissue/cellular/isolated mitochondria oxygen consumption using the XFe-24 Extracellular Flux Analyzer; mitochondrial respirometry for tissue (permeabilized mouse heart and soleus) and isolated mitochondria with the O2K from OROBOROS.
* Glucose and insulin tolerance tests.

## Metabolomics Core Facility

[*https://medicine.uiowa.edu/diabetes/metabolomics-core-facility*](https://medicine.uiowa.edu/diabetes/metabolomics-core-facility)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Metabolomics Core Facility provides mass spectrometry (MS)-based metabolite profiling and stable isotope tracing (13C, 15N, 18O, and 2H) services. Our targeted gas chromatography (GC)-MS panel measures over 100 metabolites. This includes TCA cycle and glycolytic/gluconeogenic intermediates, amino acids, sugars, several neurotransmitters, fatty acids, and additional elements of central carbon metabolism. Our broad, targeted liquid chromatography (LC)-MS panel measures over 250 metabolites spanning central carbon metabolism and many adjacent pathways. We also offer more narrow, modular LC-MS analysis focusing on compounds less amenable to GC-MS analysis such as NAD+, NADH, NADPH, NADP+, reduced and oxidized glutathione, ATP, ADP, AMP, and numerous intermediates of nucleotide metabolism (high energy and redox panel), acyl-carnitines (acyl-carnitine panel), short chain fatty acids (SCFA panel), bile acids (16 species), and glucose isotopologue flux. All GC- and LC-MS metabolite profiling services are performed at a tier 1 standard with metabolite identification by matching to in-house retention time and spectral libraries generated by running physical standards on our instruments.

The Core houses state-of-the art instrumentation, including four Thermo Scientific mass spectrometers: one TSQ GC-MS triple quadrupole, one ISQ GC-MS single quadrupole, and two high mass accuracy Q Exactive LC-MS Orbitraps. For data analysis, we employ specialized software including Thermo Xcaliber, Thermo TraceFinder 5.1, and Thermo Compound Discoverer 3.2. Each GC-MS is interfaced with a Trace 1310 gas chromatograph and autosampler. Both GC-MS instruments have electron ionization (EI) and chemical ionization (CI) capabilities utilized for metabolite profiling. The Q Exactive LC-MS systems are high-resolution, hybrid quadrupole-Orbitrap mass spectrometers (R=140,000) interfaced with Vanquish and Horizon ultra-high pressure liquid chromatography (UHPLC) systems. These systems include a binary solvent pump, column heater, and autosampler. The Q Exactives are capable of performing tandem mass spectrometry (MS/MS) experiments for extra confident metabolite identification, limited positional labeling analysis, and identifying unknown compounds.

## Microbiome Core

[*https://microbiomecore.sites.uiowa.edu/*](https://microbiomecore.sites.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Microbiome Core is supported, in part, by the Holden Comprehensive Cancer Center and provides the necessary technology and expertise for routine microbiota analysis from any given sample. Services offered include sample processing and storage, microbial DNA extraction, library preparation, metagenomic sequencing, and data analysis. Investigators can customize core services to address the needs of their research project. Standardized protocols are in place for each service and quality results are provided in a timely manner.

## Neural Circuits and Behavior Core (NCBC)

[*https://ncbc.medicine.uiowa.edu*](https://ncbc.medicine.uiowa.edu)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The NCBC is located inside the Pappajohn Biomedical Discovery Building, adjacent to mouse barrier and non-barrier animal facilities. The NCBC comprises over 3,000 square feet of space containing equipment for users to perform mouse behavior, imaging, and histology experiments.

*Behavioral equipment:* The NCBC has a variety of off-the-shelf and custom behavioral equipment available, including sixteen beam-break Activity Monitoring chambers (Columbus Instruments), Elevated Plus, Elevated Zero, Forced Swim, Light/Dark box, four Open Field arenas, Tail Suspension, Inhibitory Avoidance (Maze Engineers), four Fear Conditioning boxes (CleverSys), Grip Strength, Rotarod (Ugo Basile), Digigait, Balance Beam (Maze Engineers), Erasmus Ladder (Noldus), four Acoustic Startle/Paired Pulse Inhibition boxes (San Diego Instruments), four Three-chamber Social Choice arenas, Conditioned Place Preference, four Spatial Object Recognition arenas (Noldus), four Novel Object Recognition arenas (Noldus), Barnes Maze (San Diego Instruments), T-Maze (San Diego Instruments), Y-Maze (San Diego Instruments), four custom Eyeblink Conditional apparatuses, and four touchscreen mouse Operant Conditioning boxes (Lafayette Instruments). The NCBC has Noldus Ethovision, CleverSys FreezeScan, Matlab, and Python software available for behavior data analysis on a dedicated computer workstation.

*Electrophysiology equipment*: The NCBC has eight Wireless Mouse amplifier systems (Pinnacle) for telemetric monitoring of EEG and EMG signals.

*Optogenetics equipment*: The NCBC has four LED modules and a controller (Doric Lenses) for optogenetic stimulation.

*Histology/Imaging equipment*: The NCBC has a variety of histology and imaging equipment, including: a Leica CM3050S Cryostat, Leica TCS SPE confocal microscope, Neurophotometrics fiber photometry system, LaVision UltraMicroscope II Light Sheet Microscope, Bruker Ultima In Vitro (with FLIM capabilities), Investigator In Vivo multiphoton microscopes with SpectraPhysics MaiTai HPDS TiSapphire lasers, two UCLA Miniscopes, and an Inscopix nVista v3 miniscope. The NCBC has Bitplane Imaris, Fiji/ImageJ, Matlab, and Python software available for image data analysis on a dedicated workstation with Dual 8-Core Xeon processor, 512 GB RAM, 24 GB NVIDIA Quadro P6000 GPU, and 4 TB SSD RAID 0 data storage.

*Surgical equipment*: The NCBC has two Kopf precision stereotaxis with Leica S4E dissection stereomicroscope, two isoflurane vaporizers/scavengers, two homeothermic monitoring systems, two WPI UMP3 microsyringe pumps, a Germinator 500 dry bead sterilizer, and a Somnosuite and peristaltic perfusion pump for transcardial perfusions.

## Nuclear Magnetic Resonance Facility (NMR)

[*https://medicine.uiowa.edu/nmr/*](https://medicine.uiowa.edu/nmr/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Carver College of Medicine NMR Facility supports the biomedical research community with three instruments, a wide variety of NMR techniques, and the expertise to determine molecular structure and dynamics and to probe molecular interactions of a wide range of biomolecules. We offer a full spectroscopic and interpretive service, as well as assistance and training for researchers who wish to perform their own experiments. Available instrumentation includes: a Bruker Avance II 800 MHz spectrometer equipped with a TCI cryoprobe and 60 sample changer with barcode reader, a Bruker Avance NEO 600 MHz spectrometer equipped with a QCI-P cryoprobe, and a Bruker Avance II 500 MHz spectrometer with a TXI probe and 60 sample changer with barcode reader. Examples of services that can be provided by the NMR Facility include: (1) optimization of NMR sample preparation and NMR solution conditions; (2) design and development of research plans using NMR spectroscopy; (3) assistance with grant writing involving NMR spectroscopy; (4) determination of 3D structure and dynamics of protein in solution; (5) analysis of protein-ligand or protein-protein interactions; (6) structural studies of oligosaccharides and nucleic acids; (7) assistance in protein structural modeling and calculations; (8) support of drug discovery programs by conducting NMR-based screens; (9) support of metabolomics studies; (10) assistance with SAXS studies; and (11) help with NMR data collection, processing, and analysis.

## Office of Animal Resources (OAR)

[*https://animal.research.uiowa.edu/office-animal-resources-oar*](https://animal.research.uiowa.edu/office-animal-resources-oar)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The OAR provides the expertise, care, and resources necessary for the maintenance of research animals. The OAR's mission is preservation of the university's animal research privilege and maintenance of a quality animal research environment. The animal research facilities are comprised of approximately 140,000 square feet of housing and support space and accommodate multiple species in several campus locations. The OAR team includes five full-time veterinarians (all are board certified by the American College of Laboratory Animal Medicine, ACLAM), five veterinary technicians and 50+ animal care technicians. This team of skilled animal care specialists can advise and instruct researchers on appropriate methods for anesthesia/analgesia, surgery, biosampling, and euthanasia.

The university's animal research program has a PHS Animal Welfare Assurance (A3021-01), is a registered research facility with the United States Department of Agriculture (USDA No. 42-R-0004), and is fully accredited by the Association for Assessment and Accreditation of Laboratory Animal Care, International.

## Office of the Institutional Animal Care and Use Committee (IACUC)

[*http://animal.research.uiowa.edu*](http://animal.research.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The IACUC reviews all research and teaching protocols involving the use of animals and fulfills all other mandated oversight and compliance responsibilities.

*Note: the information below should be in the “Vertebrate Animals” attachment, not “Facilities & Other Resources” attachment. A Vertebrate Animals attachment should be included if you answered “Yes” to the question “Are Vertebrate Animals Used?” on the R.220 – R&R Other Project Information Form. Information should include the following:*

1. **Description of Procedures (Vertebrate Animals Section)**

Provide a concise description of the proposed procedures to be used that involve live vertebrate animals in the work outlined in the Research Strategy section. Identify the species, strains, ages, sex, and total number of animals by species to be used in the proposed work. If dogs or cats are proposed, provide the source of the animals.

1. **Justifications (Vertebrate Animal Section)**

Provide justification that the species are appropriate for the proposed research. Explain why the research goals cannot be accomplished using an alternative model (e.g., computational, human, invertebrate, *in vitro*).

1. **Minimization of Pain and Distress (Vertebrate Animal Section)**

Describe the interventions including analgesia, anesthesia, sedation, palliative care, and humane endpoints to minimize discomfort, distress, pain, and injury.

1. **Method of Euthanasia (Cover Page Supplement / PHS Fellowship Supplemental Form)**

Provide a justification for methods of euthanasia that are not consistent with the American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals.

Recommended text from University of Iowa IACUC: Animals will be euthanized by methods consistent with the recommendations of the American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals: 2020 Edition.  
*Note:  If you need assistance to determine whether or not your method of euthanasia is consistent with the 2020 AVMA Euthanasia Guidelines, please contact the IACUC Office at 319-335-7985, or iacuc@uiowa.edu.*

## Protein and Crystallography Facility

[*https://medicine.uiowa.edu/crystallography/*](https://medicine.uiowa.edu/crystallography/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Protein and Crystallography Facility provides comprehensive support and infrastructure for protein production and purification, biophysical characterization, and structural studies. This includes four BioRad FPLCs for protein purification, a Wyatt NanoStar dynamic and static light scattering instrument for aggregation and protein size determination, a ForteBio Octet RED96 bio-layer interferometry system for protein:protein and protein:DNA binding studies, a thermal shift assay workflow to analyze protein stability and ligand binding using a BioRad CFX96 qPCR instrument, a Refeyn TwoMP Mass Photometer to determine mass of biomolecules in solution, a Lumicks C-Trap optical tweezers instrument for measurement of single-molecule interactions and properties, a SPT LabTech Mosquito nano-volume robot for setup of 96-well crystallization screens, a Formulatrix RockImager2 for imaging crystal trays, and a SPT LabTech Dragonfly liquid-handling robot for preparation of custom solution arrays. X-ray diffraction data is collected remotely by shipping to our 4.2.2 Molecular Biology Consortium beam line at the Advanced Light Source (Lawrence Berkeley National Laboratory). The Protein and Crystallography Facility also enables analysis by small-angle X-ray scattering (SAXS) in line with size exclusion chromatography (SEC) and multi-angle light scattering (MALS), whereby data are routinely collected by mailing into the 18-ID-D Bio-CAT beam line at the Advanced Photon Source (Argonne National Laboratory). Workflows for performing negative stain EM and cryo-EM are available. Screening of grids is performed on a Hitachi 7800 TEM available in the Central Microscopy Research Facility on campus. Cryo-EM grid preparation is performed using our Thermo Fisher Vitrobot Mark IV instrument. Additional cryo-EM grid screening is performed at multiple other facilities before collecting data at one of the National Centers for Cryo-EM. The cryo-EM data processing software CryoSPARC is freely available to users on the Argon HPC cluster on campus. A workstation is available in the facility and equipped with all necessary structural biology and modeling software curated by SBGrid, which provides automatic software package updates.

## Protein Facility

[*http://www.protein.iastate.edu*](http://www.protein.iastate.edu)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

*This facility is available for use by Carver College of Medicine investigators through a partnership with the Iowa State University Office of Biotechnology in Ames, Iowa.*

The Protein Facility of the Iowa State University Office of Biotechnology is open to faculty and students from the university, other educational institutions, and industry scientists and is a complete resource for protein and antibody services. The facility offers protein/peptide sequencing, large- and small-scale peptide synthesis (Fmoc), matrix-assisted laser desorption/ionization (MALDI) mass spectrometry, SDS-PAGE/electroblotting, 2-D gel electrophoresis, isoelectric focusing (IEF), in-gel and solution digestion, tandem mass spectrometry (LC-MS/MS), ion mobility mass spectrometry (IM-MS), digital image acquisition and analysis using the Typhoon imaging system and the 2D gel documentation/analysis system, and semi-preparative, analytical and micro-analytical high performance liquid chromatography (HPLC). The facility also offers a wide range of services to support antibody or tissue culture related projects. Techniques are provided on an individual charge basis and include animal immunization, cell fusion and hybridoma culture maintenance, cell culture and maintenance of other cell lines used in biotechnology and virology laboratories, large-scale mammalian cell culture (bioreactor), blood sera collection, antibody purification and isotyping, cryopreservation and cryostorage of cell lines (-140o C), and ELISA tests.

## Proteomics Facility

[*https://medicine.uiowa.edu/proteomics/*](https://medicine.uiowa.edu/proteomics/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Proteomics Facility houses mass-spectrometers and supporting instrumentation for analysis of proteins and peptides. Services include protein identification, protein expression profiling, accurate weight determination for intact macromolecules, characterization of post-translational modifications, and rapid biotyping to determine bacterial strains. Data analysis can be provided using MASCOT, Proteome Discoverer, MaxQuant, or MSFragger search engines with final reports available in Scaffold, Excel or occasionally Skyline for peptide-centric projects. Instrumentation includes a Thermo LUMOS Orbitrap, a Thermo Q-Exactive hf Orbitrap and a Bruker Autoflex III MALDI TOF/TOF.  ESI instruments are coupled to Ultra High-performance liquid chromatographs. Common tasks include extraction and comparative tissue proteome profiling using isobaric tags to encode and pool distinct treatments of 10-18 animals simultaneously. These protocols gather data by cycling through three stages of mass isolation and fragmentation in conjunction with 2 stages of chromatographic fractionation. This protocol yields a high-fidelity atlas of 3 to >5k proteins depending upon the tissue and modifications targeted.

## Radiation and Free Radical Research Core (RFRRC)

[*https://frrbp.medicine.uiowa.edu/research-core*](https://frrbp.medicine.uiowa.edu/research-core)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The RFRRC is supported, in part, by the Holden Comprehensive Cancer Center and was established to provide free radical and radiation biology expertise, reagents, technologies, and analysis for Iowa investigators doing basic, pre-clinical, and clinical research. While the expertise for the RFRRC is based in the Free Radical and Imaging Program in the Holden Comprehensive Cancer Center, the RFRRC has users from across and outside the University of Iowa in a variety of disciplines. The three basic services provided by the core are outlined below.

1) Ionizing Radiation Services (IRS). Ionizing Radiation Services (IRS) services include: whole body radiation, partial body radiation, dosimetry, autoradiography, chemiluminescent quantification, high dose and low dose rate radiation, preclinical radiotherapy irradiations for animal experiments, and cell cycle analytical tools that are critical to understand cellular responses to radio-chemo-therapy. The x-ray source (Xstrahl) is capable of delivering filtered or unfiltered x-rays, with a maximum x-ray energy of 300 kVp. The gamma ray source is capable of delivering low or high dose rates of monoenergetic (0.667 MeV) gamma radiation, with a range of 10-3200 cGy/minute. Over the past several years the total doses to inanimate or animate objects have ranged from 5 cGy-13,000,000 cGy. The x-ray and gamma-ray facilities have been used for total body or partial body irradiation of tumors in experimental mice, rats, dogs, as well as cancer or normal cell cultures grown *in vitro*.

Additonally, the core recently installed a Small Animal Radiation Research Platform (SARRP). SARRP is the most advanced commercially available 3D image-guided micro irradiator manufactured by Xstrahl. Through state-of-the-art image acquisition, reconstruction, and treatment planning, SARRP serves as a dynamic research tool for preclinical radiobiology research. By enabling researchers to replicate clinical practice through imaging, target localization, and dose validation. SARRP allows for an accurate and targeted practice for both short and long-term studies, all while minimizing normal tissue toxicity through precise target validation. SARRP utilizes a fully integrated and stand-alone treatment planning software, MuriPlan[.](https://xstrahl.com/life-science-systems/muriplan/) The researcher can acquire a CT, register images, contour the target or normal tissue, define the isocenter, design beam arrangements, calculate and verify dose, save treatment plans for later use/reference, and execute the designed treatment. The core lab also provides investigators the services of board certified medical physicists based in radiation oncology for designing and confirming treatment plans and dosimetry.

2) Electron Paramagnetic Resonance (EPR). EPR services include other detection methodologies for measuring free radicals, singlet oxygen, nitric oxide and an array of related oxidants and oxidative damage products. The EPR facility assists users in the detection of: free radicals in systems that range from solids, solutions, cells, tissues, and whole animals; nitric oxide and related metabolites including 4-hydroxynonenal; Bodipy H2O2; superoxide; peroxynitrite, MDA/TBARS; indicators of lipid peroxidation that are detected with fluorescence spectroscopy; oxidation of fluorescent dyes as indicators of oxidation reactions in living cells; UV-Vis spectroscopy for kinetic studies of PhGPx; cellular oxygen consumption for studying metabolic oxidations reactions; oxidative stress-indicators using HPLC including DNA damage products, antioxidants such as vitamins C and E, beta-carotene, precise cell volume measurements and Seahorse Metabolic Profiling Services using the Seahorse XF96 analyzer.

3) Antioxidant Enzyme Services (AES). AES provide easy access to technologies for modifying and measuring molecules responsible for pro-oxidant formation, metabolism of reactive oxygen species, and mediators of redox biology including: anti-oxidant proteins/enzymes, small molecular weight cellular thiols and reductants, as well as redox mediated signaling and gene expression pathways governing growth, differentiation, and cell injury processes. These services include molecular biology reagents to transfect and infect cells with adenovirus and plasmid vectors that cause over expression of anti-oxidant proteins. In addition, these services provide quality assurance on the levels of expression and enzymatic activity of cells, and ensure that the desired stable integration or transient expression of various proteins has occurred. They also provide RTPCR analysis of SNPs and other genes of interest in free radical biology. Resources available through the AES include antibodies, cDNAs, lentiviral vectors, cell lines, genetically engineered mouse models, primers, and well characterized expression vectors. The AES works closely with other facilities in this regard, including the Iowa Institute for Human Genomics and Viral Vector Core. Techniques include: measuring thiols and antioxidant enzyme activity using activity assays, activity gels, spectrophotometric assays and HPLC assays; measuring immunoreactive protein for antioxidant enzymes using western blotting; measuring steady-state mRNA levels for antioxidant enzymes using PCR analysis; determining antioxidant enzyme gene copy number and gross chromosomal changes; transfecting and characterizing cell lines expressing antioxidant enzyme sense and antisense cDNAs; maintaining and distributing a repository for reagents used in the study of antioxidant proteins (i.e., antibodies, cDNAs, expression vectors, siRNA reagents and cell lines); and expertise and equipment for studying a range of O2 tensions from radiobiological hypoxia (<0.1% O2) to physiologically relevant tissue O2 tensions (4-6% O2) in tissue culture experiments measuring clonogenic cell survival.

The following enzyme assays are routinely available: copper-and zinc-containing superoxide dismutase (CuZnSOD), manganese-containing superoxide dismutase (MnSOD), catalase (CAT), glutathione transferases (GSTs), glutamyl transpeptidase (GGT), glutamylcysteine synthetase (GCS), glutathione reductase (GR), glucose-6-phosphate dehydrogenase (G6PD), thioredoxin reductase (TRR), and glutathione peroxidases (GPx). Assays for the detection of prooxidant production in living cells (superoxide, hydrogen peroxide, lipid peroxidation products, etc.) are also available. Antibodies, cDNA probes, lentiviral vectors, and transplantable human tumor xenograft models are available. The AEC will also aid in transfecting conditional over expression cDNAs and lentiviral vectors into cell lines of interest to investigators and will confirm their expression. Services to measure all five-electron transport chain (ETC) complex activities, TCA cycle enzymes, including total aconitase and citrate synthase, glutathione/glutathione disulfide, thioredoxin/thioredoxin disulfide, glucose, ATP, lactate, NADP+/NADPH and NAD+/NADH are also available for monitoring oxidative metabolism. AES staff will carry out the proposed work or will advise the user and staff on how to perform and analyze the experiments in their own labs.

## Research Development Office (RDO)

[*https://research.uiowa.edu/research-development-office*](https://research.uiowa.edu/research-development-office)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The RDO is a core unit within the Office of the Vice President for Research that strives to connect investigators to resources that support and increase their competitiveness in obtaining extramural research funding. RDO team members provide opportunities that help researchers identify funding opportunities, develop grantsmanship skills, and create multi-disciplinary collaborations that support successful research proposals. This includes providing training and access to a searchable database on available funding opportunities, coordinating resources for grant writing, such as workshops, a library of examples proposals, and a researcher handbook, and orchestrating campus-wide initiatives that foster networking.

## Scientific Editing and Research Communication Core (SERCC)

[*https://medicine.uiowa.edu/sercc/*](https://medicine.uiowa.edu/sercc/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The SERCC helps researchers succeed with their funding efforts and scholarship by providing resources and services to maximize the clarity of scientific documents – including grant proposals, manuscripts, and correspondence with program officers and journal editors. The core is staffed by editors who have advanced degrees in the life sciences and offer detailed editorial review of writing projects based on extensive experience in both laboratory research and editing of scientific content.

Investigators can consult with core staff as they develop their writing projects and/or request in-depth advice on written drafts. Multiple levels of feedback on drafts are offered, including:

* Mechanics: correction of grammar, typographical, and other errors
* Style, clarity, and presentation: suggestions toward
  + improving text flow and sentence/paragraph structure
  + highlighting the significance of the research, and
  + achieving a single voice (for multi-author documents)
* Science: pre-review from the perspective of a non-specialist reviewer; on request, feedback on how well scoring criteria for grants are addressed

Investigators receive an annotated copy of their submission. They can also request one-on-one meetings with core staff at any time to discuss writing strategies, clarify the intended meaning of their original text and/or editor comments, or discuss potential problem spots.

Core staff remain current on funding agency requirements by participating in workshops and frequently interacting with other research development professionals and editors. In addition, they produce writing resources (including templates for specific grant types), conduct didactic teaching of scientific writing (grants and manuscripts), hold office hours for one-on-one consultation, host scientific writing workshops, and participate in strategic planning sessions with groups of faculty.

## Small Animal Imaging Core (SAIC)

[*https://medicine.uiowa.edu/saic/*](https://medicine.uiowa.edu/saic/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The SAIC is a unique, world-class, multi-modal imaging research facility within the Iowa Institute for Biomedical Imaging (IIBI) and housed in the Pappajohn Biomedical Discovery Building. The SAIC occupies 5,500 square feet of space, including nine imaging suites, eight support rooms, and is contiguous to the primary barrier housing facility on campus. The mission of the SAIC is to provide University of Iowa Investigators comprehensive imaging support and expertise, to develop new imaging strategies that provide value-added solutions across scientific disciplines and provide the resources that enable researchers to transform their ideas into technologies that have a positive impact on society. It contains a collection of instrumentation and technical services necessary for the non-invasive anatomical and physiological imaging of small animals and other biological and non-biological samples.

The core instrumentation includes:

* Nuclear medicine imaging
  + Siemens Inveon PET
  + Siemens Inveon SPECT
  + QScint Imaging Solutions iQID (Alpha camera) Imaging System
* Optical and fluorescent imaging
  + Carestream MSFX-pro
  + PerkinElmer IVIS Lumina S5
* Computed tomography (CT) imaging
  + Siemens Inveon CT
  + Zeiss Xradia 520 Versa 3D X-ray/CT Microscope with submicron resolution
  + Xstrahl Small Animal Radiation Research Platform (SARRP)
* Magnetic resonance (MR) imaging
  + GE 7.0T, 901 Discovery MRI small animal scanner
* Ultrasound imaging
  + FUJIFILM Visualsonics Vevo 2100 ultrasound imaging system
* Biodistribution suite
  + Epredia Cryostar NX50 Cryostat
  + PerkinElmer 2480 Wizard2 Gamma Counter (1000 sample capacity)

The SAIC’s IT infrastructure includes a 12 TB archive system, mirrored to offsite research networked storage, four high-end workstations and a suite of image processing software including PMOD, Dragonfly, 3D Slicer, Living Image and Siemens IRW.

## Tissue Procurement Core (TPC)

<https://cancer.uiowa.edu/tissue-procurement-core>

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The TPC Facility is jointly supported by the Carver College of Medicine and Holden Comprehensive Cancer Center. The TPC provides research infrastructure in the form of a well-characterized bank of frozen and routinely processed neoplastic and normal tissues suitable for molecular, genetic, biochemical, and pathologic studies. It provides investigators with IRB-compliant, clinically annotated, quality-ensured biomaterials to facilitate cancer and non-cancer related research objectives. These materials include tissues, which are distributed as fresh, frozen, or paraffin-embedded specimens, and liquid specimens including peripheral mononuclear cell isolations, serum, plasma, extracted DNA from blood or saliva, and cerebral spinal fluid (CSF). Many can be linked to tumor samples and clinical data that are catalogued in coordination with the specimen. The TPC can provide FFPE and frozen sections (slides and scrolls) on collected materials, along with H&E staining. Additionally, TPC provides specimen procurement, processing, and shipping support for clinical trials throughout University of Iowa Health Care. All specimens collected using TPC services are inventoried in Labmatrix, the enterprise laboratory information management system (LIMS) used to catalog biomaterials collected for research throughout campus.

TPC operates a QIACube Connect System and has added an RNA processing service line with technical advice and support from the Genomics Division of the Iowa Institute for Human Genetics. RNA can be processed from blood, tissue, or other human biospecimens. Additionally, the QIACube Connect can be available for stand-alone projects employing automation for over 80 QIAGEN kits.

The TPC is a 2500 square foot facility that includes a wet laboratory space, office space, and a freezer farm. The freezer farm is comprised of 14 negative 80-degree Celsius freezers, three negative 150-degree Celsius chest freezers, and two liquid nitrogen CryoSafe freezers. Each freezer is connected to a temperature tracking system that will alert laboratory members in the event of a meaningful shift in temperature requiring action. The space is accessible to staff based on badge permissions.

## University of Iowa Pharmaceuticals (UI Pharmaceuticals)

[*https://uip.pharmacy.uiowa.edu*](https://uip.pharmacy.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

UI Pharmaceuticals is an FDA registered Contract Development and Manufacturing Organization (CDMO) specializing in pharmaceutical development, sterile and non-sterile drug product manufacturing, and analytical testing. It is the largest and longest running university facility of its kind providing contract pharmaceutical services in compliance with current Good Manufacturing Practices (GMP) for almost 50 years. UI Pharmaceuticals provides services to worldwide clients through all phases of clinical trials and commercial manufacturing. Contract pharmaceutical services include:

* + formulation and process development for injectables and solid dosage forms;
  + clinical supply and commercial product manufacturing; and
  + analytical method development, clinical and commercial product testing, and ICH stability studies.

UI Pharmaceuticals is DEA registered for controlled substances schedules I - V and can handle most potent and/or cytotoxic substances up to and including SafeBridge Category 3.

## Viral Vector Core (VVC)

[*https://medicine.uiowa.edu/vectorcore/*](https://medicine.uiowa.edu/vectorcore/)

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The VVC is supported, in part, by the Cystic Fibrosis Research Development Program, the Precision Medicine Center for Cystic Fibrosis, and the Holden Comprehensive Cancer Center. The core produces and distributes a wide variety of viral vector-based gene delivery and gene editing technologies. The VVC generates common recombinant viral vectors such as adenovirus, adeno-associated virus (AAV), and lentivirus. In addition, the core produces more specialized vectors such as helper-dependent adenovirus, baculovirus, and vaccinia virus. The VVC purifies, titers, and performs quality control assays prior to vector dissemination. The core maintains a large catalog of “off the shelf” vectors for expression of common markers (e.g., Cre, GFP) without the need for a material transfer agreement (MTA). The VVC will assemble custom plasmids to generate vectors that deliver transgenes, guide RNAs, siRNAs, gene editing machinery, or base editing machinery. In addition to vector production, the VVC offers services such as consultation and planning, troubleshooting of existing projects, design and development of novel vectors, development of novel methods of virus production, and generation of RNAi expression vectors. The core has been producing viral vectors for investigators world-wide since 1994 and is continually innovating.

# Research Institutes

## Iowa Institute for Biomedical Imaging (IIBI)

[*https://www.iibi.uiowa.edu/*](https://www.iibi.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The IIBI was formed in 2007, reflecting strong institutional support for biomedical imaging and image analysis and its importance for translational medical research. The mission of the IIBI is to foster efficient and cooperative inter-disciplinary and cross-college research and discovery in biomedical imaging, scientific visualization, machine learning, artificial intelligence, and to improve training and education within the broader community at the University of Iowa. The Institute focuses research and discovery in biomedical imaging under one umbrella at the University of Iowa in a multi-disciplinary process that facilitates new external industry relationships, new grant opportunities, and new educational processes at the undergraduate and post-graduate levels. It is composed of an interdisciplinary group of established researchers from the Colleges of Medicine, Engineering, Liberal Arts and Sciences, and Public Health and brings together researchers from all areas of medicine, including programs in cardiovascular, pulmonary, and neurological research as well as psychiatric imaging and image analysis, and radiation treatment planning.

## Iowa Institute of Human Genetics (IIHG)

[*https://medicine.uiowa.edu/humangenetics/*](https://medicine.uiowa.edu/humangenetics/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The IIHG is dedicated to promoting clinical care, research, and education focused on the medical and scientific significance of variation in the human genome. It collaborates with partners worldwide and is open to all faculty, trainees and staff at the University of Iowa, Iowa State University, and the University of Northern Iowa. The unique environment at the University of Iowa provides unprecedented opportunities to make progress in the discovery and translational phases of human genetics and in doing so to advance genetic research and to improve genetic-based clinical care.

The IIHG provides researchers with a state-of-the-art, high-throughput genetic analysis facility and supports research focused on human genetics and personalized medicine. The expertise and resources available through the IIHG enable the coordination of large-scale gene discovery with targeted gene-based and disease-based clinical diagnostics to improve disease-specific treatment.

The IIHG also develops state-of-the-art diagnostic platforms that use targeted-sequence capture and massively parallel sequencing to assess large panels of genes implicated in a variety of genetic diseases. This initiative, undertaken in partnership with clinicians at University of Iowa Health Care, facilitates genome-phenome integration and cutting edge personalized genomic medicine. Patients seen from throughout the US as part of this initiative are also offered expertise in genetic counseling as a step towards translating genetic findings into improved healthcare.

The IIHG links research and clinical missions through education for the scientific community. Opportunities include an annual bioinformatics short course, a summer internship program for genetic counselling and bioinformatics, a summer course in human genetics, sponsoring various lectures, guest speakers and scientific workshops, and an annual precision medicine conference. In addition, the IIHG hosts mini-medical school lectures and career days in human genetics and provides online brochures and educational materials to inform the community, patients, and their families about genetics testing and genetic diseases.

## Iowa Neuroscience Institute (INI)

[*https://medicine.uiowa.edu/iowaneuroscience/*](https://medicine.uiowa.edu/iowaneuroscience/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The INI is a comprehensive and cross-disciplinary neuroscience center within the [Carver College of Medicine](https://medicine.uiowa.edu/content/dedication-iowa-neuroscience-institute-marks-new-era-brain-research-ui). Led by Ted Abel, PhD, the INI conducts research to find the causes of — and preventions, treatments, and cures for — the many diseases that affect the brain and nervous system. This involves integrating and supporting neuroscience research on the University of Iowa campus to provide a framework that encourages research collaborations among INI faculty and with colleagues at other institutions, and to convey the excitement of neuroscience research to the public, both within the State of Iowa and nationally. With more than 135 members, the INI provides synergy within the broader neuroscience community that leads to transformative research and an intellectually-stimulating environment. The INI supports innovation in basic science, opportunities for translational application, and the ability to investigate how the nervous system mediates behavior and how this goes awry in neurodevelopmental, psychiatric, and neurological disorders. The INI sponsors multiple annual events, including intensive workshops and seminars for researchers and visiting scientists of international renown, as well as public outreach events including artists, writers, and intellectuals whose work touches on how neuroscience can inform and improve the human condition. INI faculty also reach out to state and local legislators, educators, and community leaders to advocate for the importance of neuroscience research for the promotion of mental health and the well-being of our communities.

## University of Iowa Institute for Vision Research (IVR)

<https://ivr.uiowa.edu/>

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The IVR is a translational, interdisciplinary organization whose 28 faculty members belong to seven different departments and four different colleges at the University of Iowa. The IVR faculty are committed to finding answers that will help patients suffering from blinding eye diseases, including inherited diseases affecting the retina, glaucoma, and age-related macular degeneration. Areas of research excellence include biostatistics, molecular genetics of ocular diseases, gene therapy and genome editing, induced pluripotent stem cell biology, biomaterials, retinal engineering and transplantation, disease modeling in animals and in vitro, ocular imaging, retinal cell biology, and gene expression.

## University of Iowa Institute for Clinical and Translational Science (ICTS)

[*https://icts.uiowa.edu*](https://icts.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The University of Iowa ICTS was established in 2007 to house the university’s Clinical and Translational Science Award (CTSA), to be an integrated academic home for clinical and translational science, and to create a catalytic infrastructure for nurturing the broad spectrum of T1 – T4 translational science. The unique overarching academic structure of the ICTS provides a multidisciplinary matrix for facilitating and supporting clinical and translational science throughout the university's colleges as well as University of Iowa Health Care. In addition to NIH funding, the University of Iowa provides substantial investments in support of the goals of the ICTS.

The ICTS is located on University of Iowa Health Care’s university campus and includes 14,000 square feet of administrative and educational facilities and 20,000 square feet for the Clinical Research Unit. The administrative space houses biomedical informatics staff, study and regulatory coordinators, the operations director, financial administrator, and additional administrative and operational team leadership. The administrative space also includes a conference room equipped with video conferencing capabilities to support administrative meetings, classes, research seminars, and presentations by visiting professors.

The ICTS offers a number of resources to support innovative clinical and translational investigation, as outlined below.

### Biomedical Informatics (BMI) Core

Informatics is a key component in clinical and translation research. The University of Iowa Institute for Clinical and Translational Science’s Biomedical Informatics Core (BMI) helps in the design, capture, curation, management, and analysis of human subject data for research. The BMI Core provides tools to collect and manage data. This includes REDCap for collaborative and compliant data capture and management and MyCap (Mobilizing the Participant Voice), which empowers researchers to build mobile apps to capture information directly from participants in research. The BMI Corealso provides access to UI BioShare to manage information about bio-samples. The BMI Core also collaborates with the Clinical Trials and Management Office to support Iowa Clinical Trials and Manage System (ICTS) for managing clinical trial data research protocols enterprise wide.

The BMI Core is the home of the Iowa Health Data Resource (IHDR), an initiative set forth by the University of Iowa that is aimed at improving access to health science data. The IHDR is designed by an intercollegiate team that customizes the resource to fit the broad needs of health science research on campus. This team also serves as advisors for investigators seeking the best ways to access, query, and analyze health data and how to develop grant proposals that will use this resource.

The core infrastructure supporting this is the enterprise data warehouse for research (EDW4R), which contains data from electronic health records linked to a growing number of external data including bio-sample data, genomic data, and cancer registries. EDW4R include more effective and efficient clinical and translational research support through access to EHR data that have been curated by informatics experts for scientific purposes. Investigators are empowered to use self-service tools such as TriNetX to explore this data.

Data Liaisons is an Intercollegiate Advisory Implementation (IAI) Team. This cohort of more than 50 faculty and staff from the health science colleges serve as mentors and advisors for investigators seeking the best ways to access, query, and analyze health data and how to develop grant proposals that will use this resource. In addition, data analysts, data engineers and software developers are available as resources to support clinical and translation science and data related projects.

The BMI Core supports multi-institutional electronic health record data queries via research networks, including the Greater Plains Collaborative (GPC) and TriNetX, and shares data to the National Covid Cohort Collaborative (N3C) and the *All of Us* Research Platform. The BMI Core also maintains the PCORNet common data model and the OMOP common data model to support and expand research inquiry at the national level.

In collaboration with Enterprise Healthcare and Academic IT, the BMI Core supports the IHDR Data Enclave, a secure storage service for researchers to analyze clinical data from UI Health Care on the Argon: High-performance Computing (HPC) and Interactive Data Analytics Service (IDAS) high-performance computing systems.

The BMI Core leads the Epic Optimization for Research initiative, which leverages Epic’s tools for research. This includes: a paperless Clinical Research Unit, with Research Orderset Builds, ready to go templates, and custom smartsets built to streamline ordering for study visits.

### Biostatistics, Epidemiology, and Research Design Core (BERD)

BERD serves an essential and multifaceted role within the ICTS, focusing on advancing research by offering comprehensive expertise in study design and statistical analysis. The team comprises experts with deep knowledge in biostatistics, epidemiology, and research design, enabling them to support investigators in developing and refining their studies. At the heart of BERD's mission is its commitment to methodological excellence in health care research. The consultation service is particularly well-established, offering researchers valuable assistance in crafting research protocols, improving methodological planning, and ensuring that their studies are designed to yield reliable and valid results. This support is available in both consultative and collaborative frameworks, tailored to meet the specific needs of each research project. Through their collaborative work with researchers, BERD continually seeks to improve the statistical rigor of analyses, contributing to the advancement of the field. In addition to providing these critical services, BERD also drives innovation, ensuring that the research conducted across the CTR spectrum is grounded in robust and credible evidence. These innovations are crucial in adapting to the evolving demands of clinical research, with the team pioneering approaches such as adaptive clinical trial designs, which allow for modifications to be made to a trial as it progresses, and comparative effectiveness research, which evaluates the relative effectiveness of different interventions. BERD also offers training opportunities for researchers seeking to further develop their knowledge of design and analysis of clinical and translational research studies across the T1-T4 spectrum. Their work not only enhances individual projects but also contributes to the broader goal of improving health care through the generation of credible, actionable evidence.

### Clinical Research Unit (CRU)

The CRU is a 20,000 square foot state-of-the-art facility for inpatient and outpatient studies that has 22 exam and consultation rooms, a seven-bay infusion suite, three procedure rooms, a specimen processing laboratory, one inpatient bed, a Climate Change chamber, and a dedicated staff of nurses, respiratory therapist, lab technicians, bionutrition manager, and research specialist. A specialized facility, the Human Brain Lab includes an acoustically and electrically shielded Faraday cage for detailed neuroelectrophysiology research monitoring. This unique facility was designed for research on refractory epilepsy, but also is used for a broad range of research on human brain function. The CRU also houses a unique Research Clinic for the patients of Dr. Michael Shy with heritable peripheral neuropathies. The clinic, which is designated as the Center of Excellence by the Charcot-Marie-Tooth Association, provides routine care, supports research protocols, and is serving as a model for establishing other rare disease clinics. The CRU also houses the annual Wellstone Clinic, which is a Centers of Excellence program in the Muscular Dystrophy Specialized Research Center (MDSRC) established by the National Institutes of Health (NIH) in 2003, in honor of the late Senator Paul D. Wellstone of Minnesota. The clinic is conducted annually in the CRU by Dr. Katherine Mathews who focuses on dystroglycanopathies in adult and pediatric patients.

The Early Phase Trials Unit in the CRU can accommodate inpatient and outpatient studies. The unit is staffed by infusion-trained nurses who provide services in a designated infusion suite, as well as in other areas of the hospital when it is not feasible or convenient to move patients to the CRU. The unit supports both investigator-initiated and industry-initiated trials and offers (1) safety monitoring with close physician and nursing oversight; (2) comprehensive drug administration capabilities; and (3) performance of pharmacokinetic and pharmacodynamic analyses in conjunction with clinical pharmacology faculty in the College of Pharmacy.

Mobile nursing services were established to support clinical research in inpatient areas and University of Iowa offsite areas with a goal of expanding and supporting clinical research services within and outside the main campus.

*ICTS Phenotyping Laboratories.*

The CRU also includes an analytical laboratory for assaying biological markers that are not assessed by the hospital laboratory and several other specialized phenotyping labs.

* *The ICTS Human Brain Research Laboratory* (Director, Dr. M. Howard) includes an acoustically and electrically shielded room for detailed neuroelectrophysiology research monitoring. This unique facility was designed to analyze neurosurgically treated refractory epilepsy but is now being used to investigate a broad range of studies analyzing human brain functions.
* *The ICTS Cardiovascular Physiology Laboratory* (Director, Dr. G. Pierce) tests regional blood flow, small blood vessel function, systemic hemodynamics, and sympathetic neural recordings. Analytical techniques include plethysmography, laser Doppler probing, infrared oxygenation, pneumotrace strain gauge, impedance cardiography, and nerve recordings with variety of stressors.
* *The ICTS Pulmonary Physiology Laboratory* (Director, Dr. A. Comellas) includes a pulmonary function and exercise testing facility and a human exposure chamber equipped for exposure delivery, and monitoring. Services include pulmonary functions (spirometry, diffusion capacity, whole body plethysmography, airway resistance, bronchial provocation, nitrogen washout, single breath nitrogen elimination, maximum respiratory pressures), cardiopulmonary exercise testing, methacholine challenge, sputum induction, and exhaled nitric oxide analysis. Bronchoscopy services and equipment are also performed within the CRU in the procedure suite.
* *The ICTS Bone Density Laboratory* (Director, Dr. J. Schlechte) uses dual-energy x-ray absorptiometry (DEXA) and peripheral quantitative computerized tomography (PQCT) to measure bone density.

### Engagement, Integration, and Implementation (EII) Core

The EII Core staff collaborate with investigators to support engagement and integration of stakeholder perspectives. Staff provide expert consultation and training on qualitative apporaches and analysis; patient-centered and community-egnaged methods; and dissemination and implementation research. Through our Qualititative Services Core, we provide a full range of qualitative and mixed methods services, including methodological design, grant and article writing, data collection, and project coordination. EII Core staff regularly convene the ICTS State-wide Stakeholder Advisory Board (SAB), a group of community members across Iowa representing patient advocacy groups, hospitals, nonprofits, and state and local agencies, which consultats on all aspects of research with a focus on integrating community perspectives. EII staff assist research teams in developing their own patient or community advisory boards. EII Core staff also work with investigators to design appropriate dissemination and implementation research plans, including specific aim development, method selection, sampling design, data collection, and analysis plans.

### Mobile Technology Lab

The Mobile Technology Lab currently supports a remote bi-directional data-collection platform that is flexible and easy to use. The platform can support the delivery of short surveys and collect responses. It can also support the bi-directional transfer of photos as well as short audio and video files. Finally, the platform can collect data from remote sensors and send messages based on sensor readings.

The current platform is designed to support pilot and exploratory studies and is ideal for collecting preliminary data for proposals or small studies. In addition, our platform can be customized to support larger, externally-funded projects, including multi-center projects.

Use of this resource is reviewed on a case-by-case basis by members of the Mobile Technology Lab and ICTS leadership.

### Research Coordinator Service

The ICTS has an established group of Clinical Research Coordinators, licensed RNs, and unlicensed staff to assist investigators who do not have the resources or desire to hire, train, and manage their own research staff. The coordinator core provides “full service” support, including assistance from new study identification, start-up processes, and required work throughout the entire study conduction. Study coordinators can assist with study feasibility, budget development, and negotions with sponsors, preparation of IRB applications and informed consent documents, subject recruitment, project coordination, and management of data and report forms.

The coordinators have extensive training in Good Clinical Practice (GCP), research ethics, handling of biological specimens, and standard clinical research protocols. The team can provide specialized support for all phases of inpatient and outpatient protocols.

### Regulatory Core

The ICTS Regulatory Core helps investigators navigate the regulatory requirements process by collaborating with researchers to work directly with the IRB and other regulatory agencies. The ICTS Regulatory Core provides training, services, education, and other resources to anyone at the University of Iowa that is doing research.

The ICTS Regulatory Core can support researchers in the following areas:

* Early Regulatory Development: Consultation to develop a regulatory plan. This includes sIRB assistance prior to grant submission, FDA IND/IDE consultation or submission, feasibility visits with sponsors, assistance with protocol and Data Safety Monitoring Board creation, and consultation or submission to the clinical trials website and online database of clinical research studies.
* IRB Submissions and Maintenance: We provide preparation, submission, and maintenance services for HawkIRB, commercial IRB, and sIRB submissions. We also provide assistance and consultation to investigators, coordinators, and study staff in their submissions.
* Education and Training: We provide individual or group education and training to researchers and study staff or study groups.Common training topics include regulatory submission and upkeep, regulatory requirements in research, consent form drafting, and research best practices.
* FDA Inspections: The ICTS Regulatory Core is an available resource to researchers and study staff when preparing for an FDA inspection or preparing and submitting responses to the FDA inspection.

### Translation Science Workforce Development

The primary goal of the ICTS Workforce Development Core is to train motivated and talented scholars, community members, and research professionals for careers and engagement in translational science. ICTS delivers educational offerings that are designed to be customizable across our workforce audience. Some of our education programs are broadly applicable to our workforce population, while others are targeted to specific audience(s).

* *K12 Program:* The NIH K12 Career Development Award is designed to identify and train outstanding junior faculty campus-wide who seek a career in clinical and translational research. K12 awardees are guaranteed 75% protected time to devote to their training and research activities. In addition to K awardees, the ICTS also maintains a cohort of Translational Science Scholars. These translational science scholars join the cohort of K12 scholars and participate in the Critical Thinking courses facilitated by the ICTS as well as an 8-week mentoring academy and monthly K-Club discussions.
* *Master of Science in Translational Biomedicine:* ICTS also administers the Master of Science in Translational Biomedicine, available to post-doctoral fellows and junior faculty with an appointment at the University of Iowa. The M.S. program is designed to teach students how to move biomedical discoveries into clinical applications and beyond. It is tailored for individuals who have completed training in one area of biomedicine and wish to apply their expertise to the T1-T4 research spectrum.
* *Academy for Research Professionals:* Research is also supported by the Academy for Research Professionals and the Clinical Lecture Series, focused on training and continuing education for research support staff. Topics include Good Clinical Practice, research ethics, handling of biological specimens, and standard clinical research protocols.
* *Team Science Training:* Team Science trainings are provided for investigators in collaboration with the Tippie College of Business, and focus on team composition and assembly, team process facilitation, and leadership. Team Science trainings are integrated into the Masters in Translational Biomedicine as well as our Pilot Grant Program.
* *Iowa Mentoring Academy:* ICTS is leading an initiative at the University of Iowa to implement the Iowa Mentoring Academy (IMA). The IMA offers at least one training session per semester. The curriculum is based on the Entering Mentoring program and addresses the new National Institute of General Medical Sciences (NIGMS) guidelines regarding the preparation of mentors involved in training grants. Upon the completion of mentor training (attending 6 of 8-hour long sessions), participants will receive letters of recognition.
* *Undergraduate Certificate in Clinical and Translational Science:* Aimed at introducing undergraduates to the field of translational science, this undergraduate certificate provides educational enrichment and an increased awareness of expanding opportunities in translational science, a discipline focused on moving biomedical discovery into application in the healthcare arena. Participation in the innovative CCTS Certificate provides motivated undergraduates an opportunity to connect their research activities to translational science and begin their training in this important discipline.
* *Clinical Trials Investigator Training Program:* Identifying a need to help junior investigators develop and execute excellent clinical trials, ICTS has developed this training program to provide PIs with resources and skills they need to develop their ideas into trials. This program utilizes a flipped-classroom approach to provide participants with as much hands-on support as possible while in class. Participants are eligible for ICTS services to support a grant submission of their trial.
* *Beginning and Early Stage Translational (BEST) Research Program:* Aimed at developing and supporting underrepresented populations in the health sciences, the BEST Research Program is a summer mentored training experience wherein undergraduate participants join a member of a translational research team to increase their skills and understanding in translational science. In this program, participants are paid as full-time employees for a 10-week period of the summer, receiving educational programming in addition to their time in the lab.

## University of Iowa Pappjohn Biomedical Institute (PBI)

[*https://medicine.uiowa.edu/pbi/about-institute/*](https://medicine.uiowa.edu/pbi/about-institute/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The PBI is a scientific community seeking to understand the fundamentals of biology and disease and to extend our discoveries into real-life applications that improve human health. PBI members hold academic appointments in departments across the university, and many conduct their research in the hub of the PBI, the Pappajohn Biomedical Discovery Building (PBDB). The PBDB has an open-floor layout to reduce barriers between scientific and technological specialties and to enable our scientists, engineers, physicians and trainees across disciplines to see, hear, and learn from each other on a daily basis. The institute is arranged thematically, with floors dedicated to neuroscience, diabetes, cardiovascular, neurodegeneration, auditory, and lung biology research. This environment catalyzes discovery and innovation.

# Research Centers

## Carver Family Center for Macular Degeneration

[*https://www.carverlab.org/*](https://www.carverlab.org/)

*Additional links:* [*https://www.patient-stemcells.org*](https://www.patient-stemcells.org), [*https://choroidlab.org*](https://choroidlab.org), [*https://stonerounds.org*](https://stonerounds.org/)

*Websites provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Carver Family Center for Macular Degeneration is dedicated to discovering the causes and developing treatments for diseases of the retina. As part of the Carver Family Center for Macular Degeneration, the University of Iowa’s clinical stem cell transplantation program aims to restore useful vision to people with advanced stages of retinal degenerations—ranging from common conditions such as age-related macular degeneration to rare genetic forms of retinitis pigmentosa. The program seeks to use stem cells derived from the patients’ own tissue to develop polymer-supported photoreceptor cell grafts and transplant these into the patients’ retinas to restore vision.

## Center for Auditory Regeneration and Deafness

[*https://medicine.uiowa.edu/center-auditory-regeneration-and-deafness*](https://medicine.uiowa.edu/center-auditory-regeneration-and-deafness)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Iowa Center for Deafness and Auditory Regeneration is designed to create and develop new therapeutic regimens to treat persons with hearing loss. The Center brings together investigators in the Departments of Otolaryngology—Head and Neck Surgery, Anatomy and Cell Biology, Communication Sciences and Disorders, Biology, Physiology and Biophysics, Neurosurgery, Radiology, and the College of Engineering, and is composed of several units including: Auditory Molecular Genetics Laboratories, Auditory Digital Signal Processing Laboratories, Auditory Signal Transduction Laboratories, Auditory Electrophysiology Laboratories, Human Auditory Neurophysiology Laboratory, Micro CT Laboratory, and Cochlear Implant Development Laboratories. The Center enables unique, new, and translational research initiatives by providing the organizational structure to coordinate multidisciplinary research teams, lead the recruitment of needed molecular developmental and signal transduction neuroscientists, and develop focused integrated research questions from the periphery to the central nervous system

## Center for Bioinformatics and Computational Biology (CBCB)

[*https://genome.uiowa.edu/*](https://genome.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The CBCB aims to catalyze the development of new areas of study and expand research opportunities in informatics areas related to the basic biological sciences and applied medical research. The CBCB was founded in 2002 as a joint enterprise spanning the Colleges of Engineering and Medicine, and involves faculty from five Colleges, seven afilliated Centers/Institutes/Cores, and more than 19 departments. It serves as a coordinating home for interdisciplinary research, undergraduate, pre- and post-doctoral training, faculty recruitment, and professional development. At the hub of an inherently interdisciplinary field, the goal of the CBCB is to assist in overcoming traditional disciplinary hurdles to collaboration and assist in utilizing state of the art instrumentation and analysis methods needed by 21st century biomedical and basic science research. The CBCB has extensive data storage and processing capabilities, as well as a wealth of installed and maintained software analysis tools to enable research and experiment execution at the leading edge of modern biomedical research.

## Center for Immunology and Immune-Based Diseases

[*https://medicine.uiowa.edu/immunologycenter/*](https://medicine.uiowa.edu/immunologycenter/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The mission of the Center for Immunology and Immune-Based Diseases is to achieve an integrated and multidisciplinary approach to the study of immunology in its diverse manifestations. The Center coordinates and facilitates interactions among members of the University of Iowa biomedical research community in order to advance education, research, and clinical applications in immune-related diseases. Members include scientists engaged in basic and applied research, education, and clinical studies of immunology and immune-based diseases across the University of Iowa campus community, and thus comprise a diverse group of investigators with a shared interest in immunology in its broadest sense and a collective expertise necessary to advance the understanding of the multifaceted roles of the immune system in biology. Many Center members have conducted corporate-sponsored research projects, as well as collaborative projects that involve multiple institutions. Additionally, Center members use a large number of *in vitro* and *in vivo* models of immune responses that may be useful as models for testing pharmaceuticals. The Center holds a monthly Research-in-Progress seminar in an informal discussion format to allow investigators to receive feedback on grants in the planning stage, novel preliminary findings, or challenging research problems. The Center also holds an annual retreat that enables opportunities for members to establish new collaborations and exchange ideas on research projects.

## Center for Neurodegeneration

[*https://medicine.uiowa.edu/neurodegeneration/*](https://medicine.uiowa.edu/neurodegeneration/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Center for Neurodegeneration integrates basic science and clinical research to improve treatment of neurodegenerative diseases for underserved rural populations in Iowa and beyond. The Center is housed on the 5th floor of the Pappajohn Biomedical Discovery Building and funded by NIH grants, the Roy J. Cver Charitable Trust, and additional philanthropic support. It is comprised of a diverse team of neurologists, neuroscientists, biochemists, physiologists, neuro-imaging scientists, and data-scientists who work collaboratively to expand clinical and research efforts that advance disease-modifying therapies for individuals with neurodegenerative disease such as Alzheimer’s disease, Parkinson’s disease, Dementia with Lewy Bodies, and Amytrophic Lateral Sclerosis. The Center includes a Parkinson’s disease research centers of excellence provides support and infrastructure for University of Iowa translational research and clinical trials.

## Craniofacial Anomalies Research Center (CARC)

[*https://medicine.uiowa.edu/craniofacial/*](https://medicine.uiowa.edu/craniofacial/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

Since its establishment in 1990, the University of Iowa CARC has been focused on the identification of genes that contribute to, and the development of treatments for, human cleft lip and palate (CL/P), craniofacial anomalies, and dental/oral disorders. The human genetics team based at this Center is harnessing the latest technology to make discoveries in human genetics, which have yielded qualitative and quantitative advances in understanding the etiology of orofacial clefting (OFC), craniosynostosis, dental defects, and pertubations in craniofacial growth. The Center includes clinicians and researchers from multiple departments within the Carver College of Medicine, College of Nursing, College of Dentistry, College of Liberal Arts and Sciences, College of Pharmacy, and College of Public Health. The Center has made many important contributions to the genetic underpinnings of craniofacial anomalies and researchers are currently investigating the causes of clefting by determining how genetics, family history, and the environment may influence the risk of having a child with CL/P. In addition, investigators within the Center are also interested in understanding how quality of life, school, and well-being are affected by having CL/P and related craniofacial malformations. Studies related to acid reflux and healing for patients with clefts are being developed in addition to investigating language and brain function in infants with oral clefts. Center researchers are using adult progenitor cells and gene therapy to regenerate alveolar and palatine bone as well soft tissues to deliver better patient care. The Center has an established tissue bank with adapted cell lines to study craniofacial genetic defects. With a focus on new RNA therapeutic technologies investigators work with clinicians and researchers to develop innovative approaches to wound healing, tissue and bone regeneration. These new translational approaches fit with the NIH personalized medicine strategies. The Center holds weekly workshops to encourage collaborations with researchers across the nation and mini-symposia on craniofacial and dental research. The Center welcomes new projects and investigators who have an interest in translational science.

## François M. Abboud Cardiovascular Research Center (ACRC)

[*https://medicine.uiowa.edu/cardiovascular/*](https://medicine.uiowa.edu/cardiovascular/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The ACRC was established in 1974 as the first major University of Iowa multidisciplinary, biomedical research initiative. ACRC investigators have made fundamental discoveries that have led to a greater understanding and more skillful management of heart disease and stroke. Key research themes include: arrhythmias and sudden cardiac death; atherosclerosis and vascular biology; cardiomyopathies and muscular dystrophies; cardiovascular genetics and development; cystic fibrosis, pulmonary hypertension, and other lung diseases; diabetes and obesity; hypertension; inflammation; lipids; metabolism; neurological and neurovascular diseases; stroke; transplantation and mechanical assist device therapy; and valvular heart disease. Ongoing studies include basic, translational, clinical, and outcomes research.

The ACRC models a culture of collaboration, team research and mentoring that has been emulated across the University of Iowa campus and adopted by most successful academic research institutions. It is is comprised of over 100 researchers and fosters collaborative partnerships among programs, investigators, and cores within and outside the university in areas such as drug, device, and biotech development. Over the years, members have been awarded more than $500 million in federal grant support and trained more than 1000 predoctoral and postdoctoral fellows. The work of ACRC scientists has paved the way for innovative diagnostics, medicines, and treatment strategies while nurturing new generations of dedicated investigators.

## Fraternal Order of Eagles Diabetes Research Center (FOEDRC)

[*https://medicine.uiowa.edu/diabetes/*](https://medicine.uiowa.edu/diabetes/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The FOEDRC at the University of Iowa serves to promote the advancement of knowledge regarding the pathophysiology, treatment, and prevention of diabetes and its complications. Over 100 research faculty from across the university are members of the FOEDRC. The Center utilizes a multi-pronged approach to promote cutting-edge diabetes research, rooted by the active recruitment and support of superlative, highly-creative diabetes researchers. Research support from the FOEDRC includes research scholar awards to tenure track scholars who show outstanding promise in the field of diabetes/obesity research, a pilot/feasibility project program to assist investigators hoping to establish or further advance their career in diabetes/obesity research, and a Bridge-to-the-Cure philanthropic mechanism to fund patentable discoveries that have promise to be translated to diabetes-related therapies. In addition, the FOEDRC maintains a T32 training grant that fosters the development of postdoctoral trainees in member laboratories. The FOEDRC also oversees two core facilities:  1) the Metabolic Phenotyping Core, which provides investigators specialized and non-invasive metabolic assays that are essential in phenotyping mouse and other animal models with diabetes, its complications, obesity, and related metabolic disorders; and 2) the Metabolomics Core Facility, which provides investigators with metabolite profiling and isotope tracer analyses covering a number of metabolic pathways using high resolution mass spectrometry interfaced with either gas chromatography (GC) or liquid chromatography (LC). To promote communication about diabetes research, the FOEDRC coordinates a weekly “Frontiers” seminar series featuring talks by cutting-edge diabetes and obesity researchers from Iowa and across the country. Other research forums sponsored by the FOEDRC include a monthly “chalk talk” series for grant proposal development, an annual diabetes research off-campus retreat, and an annual diabetes research day on campus.

## Helen C. Levitt Center for Viral Pathogenesis and Disease

[*https://medicine.uiowa.edu/research/centers-programs-institutes/helen-c-levitt-center-viral-pathogenesis*](https://medicine.uiowa.edu/research/centers-programs-institutes/helen-c-levitt-center-viral-pathogenesis)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Helen C. Levitt Center for Viral Pathogenesis and Disease at the University of Iowa supports interdisciplinary activities directed to understanding the role of viruses in human disease by: supporting educational opportunities for trainees in virology, viral-related immunology, and pathogenesis to strengthen virology research; developing new approaches to viral disease prevention, diagnosis and treatment; and improving professional and public understanding of the nature and impact of viral diseases. The Center is comprised of faculty and trainees from the Departments of Internal Medicine, Microbiology and Immunology, Pediatrics and Pathology. A weekly journal club provides a platform for students to present their own work and to discuss papers containing key research advances for the group. The Center supports visiting speakers, and a bi-annual “All Iowa Virology Symposium” joining virologists from the University of Iowa, Iowa State, and other schools, industry, and institutions in the Midwest. Finally, the Center provides travel funding for graduate students, postdoctoral trainees, and faculty to present their work at national and international virology-related meetings.

## Holden Comprehensive Cancer Center (HCCC)

[*https://cancer.uiowa.edu/*](https://cancer.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The mission of the Holden Comprehensive Cancer Center (HCCC) is to decrease the pain and suffering caused by cancer in Iowa, surrounding communities, and around the world through improved cancer prevention and treatment based on the three interdependent missions of research, clinical service and education. The HCCC has been a recognized cancer center at the University of Iowa since 1980 and is Iowa's only National Cancer Institute (NCI)-designated comprehensive cancer center, a designation it has held since 2000. The HCCC coordinates cancer-related patient care, research, and education across many departments and colleges at the University of Iowa. Researchers and treatment specialists meet regularly in one of 15 multidisciplinary oncology groups. Research programs within the HCCC include: 1) Cancer Genes and Pathways; 2) Experimental Therapeutics; 3) Free Radical Metabolism and Imaging (FRMI); and 4) Cancer Epidemiology and Population Science. The HCCC provides its members with subsidized access to state-of-the-art services and resources available through the core facilities at the University of Iowa. The facilities provide quality products and services that enhance the research efforts of HCCC investigators to foster basic and translational research. In addition, the HCCC operates a tissue repository to preserve and catalog cancerous tissue samples for use by researchers and currently has tumor samples from more than 50,000 patients. The HCCC also operates an Oncology Registry that contains a record of the history and treatment of patients with cancer and precancerous conditions.

The HCCC provides support for a number of resources dedicated largely, but not totally, to support innovative cancer research. Some of these resources include the following core facilities:

### Biospecimen Procurement and Molecular Epidemiology Resource (BioMER)

[*https://cancer.uiowa.edu/biospecimen-procurement-and-molecular-epidemiology-resources-biomer*](https://cancer.uiowa.edu/biospecimen-procurement-and-molecular-epidemiology-resources-biomer)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The BioMER provides investigators with IRB-compliant, clinically annotated, quality-ensured biomaterials to facilitate cancer and non-cancer related research objectives. These materials include tissues, which are distributed as fresh, frozen, or paraffin-embedded specimens, and serum, plasma, and germline DNA, many linkable to tumor samples and clinical data catalogued in coordination with the tissue. All specimens collected using BioMER services are inventoried in Labmatrix, the enterprise laboratory information management system (LIMS) used to catalog biomaterials collected for research throughout campus. The BioMER serves as a single point of entry for investigators requesting specimens and/or related data for research use.

The BioMER is a Shared Resource resulting from the merger and expansion of the Tissue Procurement Core (TPC) and Molecular Epidemiology Resource (MER). The TPC provides research infrastructure in the form of a well-characterized bank of frozen and routinely processed neoplastic and normal tissues suitable for molecular, genetic, biochemical, and pathologic studies. The MER is a network of prospective observational data repositories that utilize highly annotated, prospective, observational data from defined cohorts of cancer patients. The BioMER supports studies that are dependent on a linkage of clinical and molecular data by using two unified biorepository consents, one each for cancer and non-cancer related studies. This allows current and future use of tissue for research, permissions to link that tissue to clinical data, and to recontact the patient for additional studies.

### Biostatistics Core

[*https://cancer.uiowa.edu/biostatistics-core*](https://cancer.uiowa.edu/biostatistics-core?_gl=1%2A1dnl2w5%2A_ga%2AMTc2Nzc3MzkzNy4xNjIzNDI2MjY2%2A_ga_L7BTY7JCG8%2AMTY1NzYyODU5Ni4xMDQuMS4xNjU3NjI4OTUzLjQ1)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Biostatistics Core is a shared resource dedicated to meeting the biostatistical needs of HCCC members. Quality biostatistical support promotes good study design, efficient use of resources, and effective analysis of data. The Core provides such support in collaborations with HCCC members, other Shared Resources, and administration to advance the research and education missions of the HCCC. Our comprehensive nature assures cost-effective access to biostatistical support, which includes the design and conduct of clinical trials; protocol and grant development; protocol review and study monitoring; research data management; statistical analysis and programming; analysis reporting and publication; and education, training, and professional development. The primary resources of the Core are its biostatistics staff and faculty members.  Core personnel have a wide range of expertise, including experimental design, clinical trials, predictive modeling, computational statistics, survival analysis, genetic and genomic data analysis, and Bayesian statistics. Investigators looking for statistical support are encouraged to contact the Core early in the planning and design stages of studies to ensure proper data collection and analysis to achieve study objectives.

### Clinical Research Services (CRS)

[*https://cancer.uiowa.edu/clinical-research-services*](https://cancer.uiowa.edu/clinical-research-services)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

CRS serves as a dedicated clinical trials office inside the HCCC. It is also known as the Clinical Protocol and Data Management (CPDM) infrastructure as part of the National Cancer Institute's (NCI) Comprehensive Cancer Center designation of the HCCC. CRS supports all phases of interventional human research, including treatment and non-treatment interventions. This service includes investigator-initiated trials (IITs), national cooperative trials, consortium trials, and industry-sponsored trials. The CRS also provides trial-specific support through staff that assists in the assignment of trials to teams, protocol listing and promotion, accrual tracking, assistance with screening and consenting subjects, data management, quality assurance, and education for early career clinical investigators.

The CRS comprises a full complement of resources from feasibility through study close out. This model includes support for

* All administrative functionality concerning oversight of clinical trial support, including human resourcing components such as hiring, career growth, and educational training.
* All award management such as pre-study feasibility, regulatory and financial aspects that include but are not limited to budget development, budget negotiations, contract initiation, preparation of IRB applications, informed consent documents, and amendments.
* All coordination management (study coordination, laboratory & data management) with coordination personnel trained on good clinical practice (CGP) conducted to provide subject recruitment, project coordination, equipment maintenance schedules, availability of supplies needed to process all specimens per protocol, management of data entry, data queries, and study closeout.
* Data Safety Monitoring support for investigative studies, including direction on acceptable data and safety monitoring plans, with safety support that assesses subject safety, monitors clinical trial data integrity and protocol adherence, and provides education to investigators.

*Cancer Supported Studies*

All cancer trials run by the CRS adhere to institutional review processes as well as additional cancer-related committee or groups per the NCI designation. CRS administration will support the connection and training of investigators to enable the participation within groups; committee and processes are outlined to conduct cancer clinical trials within CRS resources.

*Use of Multi-Disciplinary Oncology Groups (MOGs)*

Multidisciplinary Oncology Groups (MOGs): MOGs are composed of clinician investigators from various disciplines (medical oncology, surgical oncology, radiation oncology, pathology, radiology, etc.), as well as basic and population scientists with an interest in a particular cancer type. The 12-disease focused MOGs and the Phase I Group provide the first step in protocol concept review and development.

The MOGs determine enthusiasm for the proposed science, potential impact of the results, and whether the resources and patient population are adequate for the proposed studies. If the MOG decides to move forward with a trial, that trial is presented by the MOG via the CRS pre-study team for feasibility review.

*Use of a Feasibility review*

Trial Resource Evaluation Committee (TREC): The TREC was established in 2011 to evaluate clinical trial feasibility. The TREC contains representation from multiple departments such as pharmacy, radiology, radiation oncology, clinical research, clinical infusion, and clinical nursing to assure there is adequate equipment, capacity, and skill that are vital for the successful conduct of these trials. TREC serves in an advisory role and reports to the MOGs if there are any concerns regarding the trial’s feasibility. The CRS team will support investigators through the TREC process. Once a protocol has been approved by the MOG with sign-off by the TREC, the MOG works with the CRS to complete development of the protocol and present it for scientific review.

*Use of a Protocol and Scientific Review*

Protocol Review and Scientific Committee (PRMC) reviews MOG-approved protocols and then approves, rejects or defers the protocol for further development. The PRMC prioritizes clinical cancer trials usually based on MOG recommendations. The PRMC also monitors studies for scientific progress and assures those with unacceptably low accrual are terminated.

Members to the PRMC are appointed for a three-year renewable term from medical oncology, surgical oncology subspecialties, gynecologic oncology, radiation oncology, pediatric oncology, pathology, nursing, pharmacy, the basic sciences and biostatistics. PRMC membership also includes patient advocates who serve as lay members with an interest in advancing science, cancer care, and the well-being of research subjects. Ad-hoc reviewers are frequently used to add additional expertise based on the focus of submitted protocols.

*Additional investigator and trial personnel expectations*

All teams using CRS resources adhere to policies set forth in the CRS standards system. All investigators using CRS resources participate and adhere to CRS educational training.

### Population Research Core (PopRC)

[*https://cancer.uiowa.edu/population-research-core*](https://cancer.uiowa.edu/population-research-core)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The PopRC supports strong observational study designs and data collection/curation methods through the following services:

* Provides efficient use of large, cancer-related, population-based datasets and other resources. This includes the research database and its linkages provided by the NCI’s Surveillance, Epidemiology, and End Reports (SEER) program. PopRC staff construct study cohorts, analytic variables and datasets; perform database linkages; maintain quality control; and develop database queries.
* Works with investigators to develop and implement appropriate design and methodology to answer population-based questions. This includes identification of appropriate data resources; development of study design, aims, and hypotheses; performance of feasibility analyses; and plans for data analysis.
* Supports population-based field research. This includes tools and systems for medical chart abstraction, recruitment/consenting of study participants, administering surveys, and participation monitoring/study management.
* Provides clinically-annotated biospecimens and corresponding clinical annotation from the SEER Residual Tissue Repository and Virtual Tissue Repository in collaboration with the HCCC Tissue Procurement Core. PopRC staff establish project feasibility and develop methodology to promote efficient use of the resource.

The primary resources of the PopRC are the expertise and time of its scientific personnel and its curated and annotated population-based data.

## Huntington’s Disease Center of Excellence

[*https://medicine.uiowa.edu/psychiatry/research/huntingtons-disease-center-excellence*](https://medicine.uiowa.edu/psychiatry/research/huntingtons-disease-center-excellence)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The mission of the Huntington's Disease Society of America Center of Excellence at the University of Iowa is to strengthen the relationship between clinical treatment and research for individuals affected by Huntington’s disease. The Center take an innovative approach to integrating clinical services, education, outreach, and research opportunities in order to benefit individuals with Huntington’s disease in a personal way as well as advance scientific efforts in the field of Huntington’s disease research. The Center supports several Huntington’s disease studies, including: observational studies and clinical trials. The Center also supports the Huntington’s Disease Clinic at University of Iowa Health Care, which provides people with Huntington’s disease and their families with comprehensive medical, psychological, and social services as well as physical therapy, occupational therapy, and genetic counseling.

## Iowa Center for Neurodegeneration

[*https://medicine.uiowa.edu/neurodegeneration/*](https://medicine.uiowa.edu/neurodegeneration/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The Iowa Center for Neurodegeneration integrates basic science and clinical research to improve treatment of neurodegenerative diseases for underserved rural populations in Iowa and beyond. The center is housed on one floor of the Pappajohn Biomedical Discovery Building and funded by NIH grants, the Roy J. Carver Charitable Trust, and additional philanthropic support. It is comprised of a diverse team of neurologists, neuroscientists, biochemists, physiologists, neuro-imaging scientists, and data-scientists who work collaboratively to expand clinical and research efforts that advance disease-modifying therapies and improve diagnostic methods to improve outcomes for individuals with neurodegenerative disease. The center is one of two Parkinson’s disease research centers of excellence in the United States to receive planning grants from the NIH and provides support and infrastructure for University of Iowa Health Care clinical trials involving the potentially groundbreaking use of existing drugs shown to reverse and prevent damage in Parkinson’s disease models. The center currently supports clinical trials in the areas of:

* Movement Disorders / Parkinson's Disease
* Alzheimer's Disease
* STAR Registry (Seniors Together in Aging Research)

## Iowa Center for Noninvasive Brain Stimulation

[*https://medicine.uiowa.edu/nbs/*](https://medicine.uiowa.edu/nbs/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The University of Iowa Center for Noninvasive Brain Stimulation is a state-of-the-art facility that conducts translational research for noninvasive neuromodulation. It is comprised of a highly collaborative group of clinicians and researchers working closely together to **1)** develop exceptional, patient-oriented clinical care; **2)** advance new and improved treatments for brain disorders using noninvasive brain stimulation, and **3)** provide training opportunities to recruit and train the next generation of scientists and clinicians that will advance the field. The Center is supported by the resources and facilities in the Department of Psychiatry and the Iowa Neuroscience Institute and houses equipment for transcranial magnetic stimulation (TMS) and transcranial current stimulation, as outlined below:

Transmagnetic stimulation

* MRI-compatible research transcranial magnetic stimulation system with MagPro X100 Stimulator, MRI-B91 Air Cooled and Cooled-B65 coil
* MagVenture MagPro X100 Stimulator with Cooled-B65 Coil and Motor Evoked Potentials Module
* MagStim Rapid-2 System
* Nexstim 5.0 Neuronavigation TMS System
* MagVenture R30

NeruoNavigation Software

* Frameless stereotactic equipment to facilitate imaging-guided TMS, including MRI-compatible Localite and Brainsight systems

Transcranial Electrial Stimulation

* Neuroelectrics StarStim 20 Transcranial Electrical Stimulation System
* Soterix transcranial direct current and alternating current stimulator

Other

* 64-lead TMS-compatible EEG system from BrainVision
* Psychophysiology equipment, Biopac
* FaceX multicamera platform – quantifies facial expression data
* MWe also have a multi-modal sensory stimulation device developed by collaborators at MIT
* N, and novel TMS coils that reach deeper or have more focality, developed by David Jiles and collaborators at Iowa State University.

There are two locations dedicated to noninvasive neuromodulation: General Hospital (W264) at University of Iowa Health Care’s university campus and the Pappajohn Biomedical Discovery Building (PBDB) directly adjacent to the Magnetic Resonance IResearch Facility. Two full time employees maintain the equipment and provide technical expertise for research studies. The noninvasive neuromodulation research program is closely aligned with the Noninvasive Brain Stimulation Clinical Program, which is located in the General Hospital and is staffed by four psychiatrists and two full time staff members who offer 10-15 TMS treatment sessions per day Monday through Friday.

## Iowa Comprehensive Lung Imaging Center (I-CLIC)

[*https://appil.medicine.uiowa.edu/*](https://appil.medicine.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The I-CLIC represents a group of investigators with a common interest in the use of quantitative imaging techniques to better understand the normal lung and the permutations leading to and defining pathologic states. The Center includes investigators in the departments of Physiology, Medicine, Radiology, Anaesthesiology, Mathematics, Electrical Engineering, Biomedical Engineering, and more. The I-CLIC is home to the Advanced Pulmonary Physiomic Imaging Laboratory (APPIL), which seeks to broaden the understanding of basic physiology and pathophysiology of the lung along with pulmonary disease co-morbidities using quantitative imaging. The APPIL also strives to translate emerging insights from image-based methodologies into tools that are applicable to the broader research community and clinical practice in order to improve the diagnosis, phenotyping, and treatment of lung disease. In addition, APPIL serves as the Radiology Center for a number of NIH-sponsored multi-center studies seeking to utilize imaging as a biomarker for assessing pathology and predicting outcomes. These research efforts are supported by a 2500 square foot CT imaging research facility strategically located between the patient areas of the University of Iowa Health Care’s university campus, the NIH-supported Clinical Research Unit, and the Animal Care Facilities of the College of Medicine. The imaging facility houses a Dual Energy, Dual Source Multiple Detector Computed Tomography Scanner (Siemens SOMATOM Force) and several MicroCT scanners including an ultra-high resolution MicroCT (Zeiss Xradia 520 Versa) capable of interior tomography of lung specimens with a voxel size down to sub-micron dimensions. In addition, there is other imaging equipment, comprehensive physiologic monitoring, a fully equipped pulmonary function laboratory including spirometry, body plethysmography, and DLCO assessment along with data analysis software, and computer clusters. The I-CLIC has also recently implemented a polarized gas laboratory in the Magnetic Resonance Research Facility (MRRF). This clinical research lab can synthesize and produce polarized Xenon-129 (129Xe) gas utilized in quantitative imaging protocols in chronic lung disease and in animal models to evaluate pulmonary structure and function in conjunction with MR imaging techniques. 129Xe MRI is a non-invasive and rapid imaging modality that uniquely measures regional gas exchange and directly probes the alveolar capillary interface. Thus, 129Xe MRI provides a way to measure the structure and function of the gas exchange interface, a key element of lung function that is not accessible using other imaging methods. Members of APPIL provide assistance to those who wish to incorporate lung imaging into their research plan. The imaging facilities are available for both human and animal studies.

## Lung Biology and Cystic Fibrosis Research Center

[*https://medicine.uiowa.edu/pbi/lung-biology-cystic-fibrosis-research-center*](https://medicine.uiowa.edu/pbi/lung-biology-cystic-fibrosis-research-center)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The goal of the Lung Biology and Cystic Fibrosis Research Center is to advance fundamental knowledge related to the causes of disease and to develop new treatments. For more than four decades, basic and clinical scientists and trainees at the University of Iowa have brought a broad and multidisciplinary approach to bear upon a variety of pulmonary diseases, and their research has changed the lives of patients and brought international recognition. Areas of research expertise in this Center include airway epithelial cell biology, animal models, antimicrobial peptides, asthma, COPD, cystic fibrosis, sarcoidosis, ciliary abnormalities, lung development, genomics, gene therapy, host defense, host-pathogen interactions, imaging, ion transport, respiratory infections, stem cell biology, and virology. Lung Biology and Cystic Fibrosis Research Center investigators are committed to making advances that will impact the lives of those affected by lung disease. The Center supports several cores including: the *In Vitro* Models and Cell Culture Core, the *In Vivo* Imaging Core, the Clinical Research Core, the Animal Models Core, the Bioinformatics Core, the Gene Transfer Vector Core, the Electrophysiology Core, the Histopathology Core, and the Imaging and Microscopy Core. These cores provide specialized expertise, develop new methodologies, attract new scientists, and serve as a catalyst for CF research. In addition, the Center supports fellowships in CF-related research, and interacts closely with the Clinical Center to facilitate translation of basic science to patients and to encourage clinical research.

## National Ferret Resource and Research Center

[*https://medicine.uiowa.edu/nfrc/*](https://medicine.uiowa.edu/nfrc/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The major goal of this Center is to provide an NHLBI-focused, centralized resource for genetic modeling in the ferret, with a focus on the distribution of biologic resources to study ferret models of cystic fibrosis and the generation of new ferret models of lung disease. In addition, the Center also forms collaborative partnerships targeting diseases of other organs. The Center has developed CRISPR/Cas9 technologies that make it possible to genetically engineer ferrets by any strategy that has been applied in mice. For example, this technology has enabled the creation of conditional *CFTR*-knockout (KO) ferrets (i.e., tissue- or cell-type specific protein deletion), G551D- and ΔF508-*CFTR* mutant ferrets (models of the most common CFTR mutations in human CF), *SERPINA1*-KO (AAT-KO) and *SERPINA1*-PiZZ (AAT-PiZZ) ferrets (which mimic the loss of a protein, or its most common mutation, associated with alpha-1 antitrypsin-deficient lung disease), ROSA-Cre-reporter ferrets (enable lineage tracing), and CreERT2-driver ferrets (enable cell type-specific and conditional control of gene expression). Thus far, over 25 distinct genetic ferret models that are directly relevant to the lung have been generated. Collectively, these models will make it possible to address very sophisticated questions based on temporal regulation of gene expression, lineage tracing of stem cells, and the ablation of genes in specific cell types. The Center has also cataloged ferret reagents that are of general use and available through the Center or commercial sources, including: cDNAs, bacterial isolates, primary airway cells from disease models, and recombinant viruses for use in ferrets. In addition, the Center has gathered information on >100 commercially available antibodies that work in ferret tissue samples (by Western blotting, immunostaining, ELISA, and immunoprecipitation), and in some cases has generated new antibodies. The Center continues to catalog antibodies evaluated by other investigators to assist the broader community in finding needed reagents. An second draft of the ferret genome has been deposited in NCBI and has enabled the first ferret microarrays on cystic fibrosis ferret lung samples and improved protein identification in ferret proteomics research. The Center is working to provide publicly accessible databases and downloadable files with improved annotation of the Ensembl gene and protein IDs (i.e., mass spectrometry Mascot files and excel files).

## Precision Medicine Center for Cystic Fibrosis

[*https://medicine.uiowa.edu/genetherapy/*](https://medicine.uiowa.edu/genetherapy/)

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The ultimate goal of the Center is to provide a forum for uniting scientists involved in diverse but relevant research fields, enabling them to focus on issues central to the development of molecular therapies for cystic fibrosis (CF). Our aim is to use the resources available from this Center to provide a fertile environment for the exchange of ideas, the sharing of expertise, and the co-mentoring of junior investigators in establishing independent CF-focused research programs. Through centralized core facilities, research meetings, and pilot grants, the Center provides a supportive, interactive, and collaborative environment at the University of Iowa that enables the expansion of new initiatives in gene therapy-based research. The Center supports five research core facilities: Vector Core, Animal Models Core, Comparative Pathology Core, Cells and Tissue Core, and Clinical Core. These research cores provide equipment, reagents and expertise at a substantial discount to facilitate the research efforts of Center members. The Center hosts a weekly gene therapy seminar, periodic guest seminars, and an annual retreat/symposium. The "work in progress" format of the weekly meetings and retreat provide excellent opportunities for the informal exchange of ideas through which innovative approaches for gene therapy can be developed. In addition, the Center’s pilot program provides seed money for research on cystic fibrosis in areas relevant to the NIDDK mission. Such research applications should be considered innovative and may potentially be high risk. These applications are funded for one or two years and have a maximum funding limit of $65,000 per year.

## University of Iowa Hawkeye Intellectual and Developmental Disabilities Research Center (Hawk-IDDRC)

[*https://iddrc.uiowa.edu/*](https://iddrc.uiowa.edu/)

*Website provided for reference only; hyperlinks/URLs are not typically allowed in NIH grants*

The University of Iowa’s Hawk-IDDRC was funded in 2021 as a P50 Center grant and is led by Drs. Lane Strathearn and Ted Abel. Its mission is to provide an organizational structure that fully integrates basic and clinical research across the lifespan—from conception to adulthood—that is focused on the prevention, diagnosis, treatment, and amelioration of intellectual and developmental disabilities (IDDs), tailored to an underserved rural population. The Hawk-IDDRC includes four research cores, as described below.

* **Administrative Core (AC)** provides leadership to ensure cost-effective and rigorous IDD research, while inspiring interdisciplinary collaboration and innovation through pilot grants, regular seminars, and a grant’s club for early stage investigators.
* **Clinical Translational Core (CTC**) applies basic science discoveries into clinical settings by streamlining patient recruitment and phenotyping, biobanking, and implementing clinical trials for the development of novel treatments that can be employed across the lifespan. The core will assist in identifying and recruiting pregnant women, children, and adults from across Iowa to participate in clinical research.
* **Developmental Genomic/Epigenetics Core (DGC)** uses RNA/exome/whole genome sequencing to uncover intrinsic genetic variation and examines the contributions of extrinsic (environmental and experiential) factors on epigenetic regulation, in association with IDD.
* **Neurocircuitry and Behavior Core (NBC).** The NBC assesses both animal and human neural circuit development and function, electrophysiology, and behavior.

In addition, the *Hawk-IDDRC Research Project* is a cross-sectional study examining the interaction of genetic and epigenetic/environmental risks in young children with developmental disabilities, including autism, integrating services from all four research Cores.

A *Dissemination and Communication Plan*ensures Hawk-IDDRC research is effectively communicated to the scientific community, educators, policy makers, government officials, and the public, in an engaging and timely manner. An *Educational Program*, involving basic and clinical scientists, trainees, the public, and IDD-affected families features monthly seminars, mentoring of young and talented investigators focused on IDD research, and an educational program aimed at the lay public and IDD community.

The Hawk-IDDRC integrates and capitalizes upon strong existing resources in the Hawkeye State: 1) the nationally renowned Center for Disabilities and Development; 2) the Iowa Neuroscience Institute; 3) Iowa’s University Center for Excellence in Developmental Disabilities (UCEDD), and 4) the Iowa Leadership Education in Neurodevelopmental Disabilities (LEND) program. The Center fosters strong existing collaborations between basic and clinical scientists, as well as the IDD community and their families, and supports 83 federally funded projects ($43 million per year). The stable, non-transitory rural population in Iowa and an interconnected telehealth system uniquely positions Hawk-IDDRC investigators to conduct longitudinal, multi-generational research, for which the University of Iowa is renowned.

## Wellstone Muscular Dystrophy Specialized Research Center (MDSRC)

[*https://medicine.uiowa.edu/mdsrc/*](https://medicine.uiowa.edu/mdsrc/)

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The overall goal of the Wellston MDSRC is to advance understanding of the various muscular dystrophies arising from the abnormal processing of dystroglycan (dystroglycanopathies), with a focus on translating research discoveries on the structure and function of dystroglycan into clinical applications for the diagnosis and treatment of patients with dystroglycan-related muscular dystrophy. It is one of six NIH funded centers nationwide and serves as a focal point for research collaborations, communication, resource sharing, and training of the next generation of muscular dystrophy researchers and clinicians. The University of Iowa MDSRC is composed of two projects and three cores that foster synergistic collaboration and coordination of research activities and promote side-by-side basic, translational, and clinical research. The specific objectives of the MDSRC projects are to (1) gain mechanistic insights into the dystroglycanopathies to facilitate the rational design of novel diagnostic and therapeutic strategies and (2) determine the natural history of the dystroglycanopathies to optimize clinical care as well as inform and enhance clinical trial design. The Center’s three cores help to achieve these objectives and include:

* *An Administrative Core* that coordinates the activities within and outside the Center and promotes an interactive and collaborative research environment. This core also educates and engages patients and patient advocates by hosting an annual conference and tours of MDSRC laboratories.
* *A Muscle Tissue/Cell Culture/Diagnostic* *Core* that serves as a national tissue and cell culture resource for research and provides state-of-the-art diagnostic testing for patients seen at University of Iowa Health Care and nationwide. This infrastructure provides key support for projects in the Center and for clinical trials of neuromuscular disease, especially Duchenne muscular dystrophy.
* *A Research Training Core* that supports year-long fellowships for medical students.