**NSU Institutional and College Information/Resources**

***Nova Southeastern University (NSU)*** is a coeducational private, not-for-profit research institution accredited by the Southern Association of Colleges and Schools Commission on Colleges. Located in Fort Lauderdale, Florida, it currently enrolls 20,877 students and to date has produced over 200,000 alumni. Classified by the Carnegie Classification of Institutions of Higher Education as an institution with “high research activity,” NSU is 1 of only 59 R2 institutions nationwide to be awarded Carnegie’s “Community Engagement” classification, which highlights NSU’s engagement and collaboration with the larger community. NSU is also the largest private, not-for-profit institution in the United States that meets the U.S. Department of Education’s criteria as a **Hispanic-Serving Institution**. As a federally designated Hispanic-Serving Institution, NSU is making a diligent effort to expand research opportunities for all scholars and researchers, including those in under-represented ethnic and racial populations. Fall 2023 student demographics are as follows: 32% Hispanic, 30% White/non-Hispanic, 17% Black/non-Hispanic, 12% other, 5% nonresident alien, 4% unknown.

For more than 50 years, NSU has been fostering groundbreaking research and a commitment to community. NSU has a Facilities and Administrative Cost Recovery Policy that incentivizes researchers with F&A allocation to their research activities. NSU also has an Assignment Modification Policy that provides that researchers on sponsored projects will be relieved of their regular duties for the period of time and percentage of effort devoted to the sponsored project.

The NSU ***College of Pharmacy***, with its ground-breaking initiatives and visionary curricula, educates future pharmacists to help people live healthier, better lives. It is the only program in the U.S. to operate a full-service community pharmacy and institutional pharmacy and has over 4,500 alumni worldwide, many of whom are leaders within the profession. The College of Pharmacy is the largest and most requested travel study program of any College of Pharmacy. The College is comprised of a diverse faculty and student body, ranking 1st for Hispanic and 14th for African-American students earning the Pharm.D. degree. The College of Pharmacy offers a Ph.D. program with world-class researchers in the pharmaceutical sciences, and sociobehavioral and administrative pharmacy. Pharm.D. students can pursue a concurrent master's degree in business administration, public health, or biomedical informatics. Themed continuing education is provided for more than 20,000 pharmacists worldwide. Graduates rank high in securing fellowships and residencies. NSU’s College of Pharmacy offers multiple degrees including the Pharm.D., the Ph.D., the M.S. in Pharmaceutical Affairs (MSPA), and the M.S. in Pharmaceutical Sciences (MSPS).

***Computers, Software, Computing, & Data Security***

*Computers & Software.* The PI has a Dell PC and Dell laptop computer. Each student/technician is equipped with a similar laptop. All team members are equipped with a secure, password-protected, networked computer with Internet access. Hard drives on all computers are encrypted using Bitlocker for Windows computers and File Vault 2 for Mac computers. NSU provides software under university-wide licensing agreements to support team communication, data collection and data analysis—including Go-to-Training, RedCAP, SPSS, AMOS, R, SAS, JMP, and NVivo—that will be utilized for this research. The combination of these information technologies contributes to the research success by assuring both safe and efficient data handling and optimal communication among members of the research team.

*Computing.* Computing resources are adequate for all data entry, data integrity and analysis activities. NSU maintains an extensive information technology network for teaching and learning, as well as research and administrative computing. A comprehensive network connects all administrative and academic buildings on campus. Fiber-optic and wireless networks provide connectivity for user access. A dedicated wide area network (WAN) with a fully staffed HELP Desk supports high speed access to central computing resources from all campuses. 1NSU, the university’s wireless network, provides connectivity in more than 30 buildings and exterior locations covering all of the university’s campus and remote sites.

NSU computers are linked to the National LambdaRail Network infrastructure, a unique nationwide network infrastructure that is owned and controlled by the U.S. research community. The contiguousness of the many kinds of networks running over the NLR infrastructure provides us with convenient and broad-based access to multiple networks, as well as access to real-world production network data.

*Data Security.* NSU’s technology ecosystem has been developed and is continuously being reviewed and revised to follow current information security best practices. Information Security, in observance of the fundamental principles of data Confidentiality, Integrity and Availability, serves as an essential factor in all technology matters, from discovery and procurement across the technology lifecycle, through to secure decommissioning and archival or destruction. Information security is applied at the endpoint device level (ex. Encrypting system disks for all NSU workstations, prohibiting users from having administrator-level permissions without multi-level review and approval, and ensuring up-to-date endpoint protection technologies), network communication level (ex. Encryption of data in-transit using encrypted transmission protocols, requiring encrypted connections for any user establishing connections to NSU resources from outside a physical NSU site), and central IT resource level (ex. Encryption for data at-rest in systems that store sensitive, confidential, proprietary or otherwise access-restricted information; application of least-privilege discretionary access controls across files, folders and applications).

Furthermore, NSU infuses increased information security awareness across its personnel, including all faculty and staff. All personnel are required to participate in interactive information security awareness training annually. The Information Security personnel at NSU are highly trained and credentialed professionals with deep technical knowledge and proven experience at administering information security in complex technology ecosystems. Likewise, NSU’s critical systems and infrastructure are managed and monitored 24-hours per day for both operational stability and information security-relevant events, ensuring that activities that deviate from the established norms of user and/or system behavior are investigated by human analysts and verified to confirm that monitored system activities conform to the scope of that which is permitted/expected.

***NSU Core Facilities***

The Core Facilities are located in the Center for Collaborative Research (CCR) in order to promote research excellence by providing access to scientific equipment and subject matter expertise thereby enhancing NSU’s research programs and their collaborating partners. The Core Facilities are operated by NSU’s Division of Research and Economic Development (DoR) which also manages the Office of Sponsored Programs, Office of Clinical Research, Office of Technology Transfer, and the Grant Writing Laboratory.

The Scientific Director for Research Facilities oversees the daily operations of the 5 core facilities: Flow Cytometry, Genomics (and Bioinformatics Support), Imaging, Cell Therapy, and Vivarium. Each of these state-of-the-art labs offers the highest quality scientific equipment maintained and operated by experienced managers and technical staff who advise researchers on sample preparation, protocol development, and data analysis as well as perform defined and customized services based on the specific needs of the researcher.

**a. Flow Cytometry Core.** The NSU Flow Cytometry Core facility provides users with state of the art instrumentation and services. The principal assets of the core consist of an analytic instrument (one BD Fortessa X-20 SORP) and one sorting instrument (BD AriaFusion SORP). The core also provides data analysis support and operates workstations with FacsDiva and FlowJo analysis software.

*Sorting Facility.* The sorting facilities of the core are housed in one dedicated room. The BD FACS AriaFusion is a flexible and highly adaptable bench top sorter. It contains five fixed-aligned, air-cooled lasers: red (637nm), green (532nm), blue (488nm) and violet (405nm) and UV (355nm). In its present configuration, the sorter is capable of performing 20 parameters (forward and side scatter plus eighteen color flow cytometry). The Aria Fusion has an increased sensitivity and flexibility due to the patented octagon pathways that maximize signal detection from each laser illuminated beam spot. These instruments are equipped with temperature-controlled chambers and have the ability to sort single cells into 96 well plates. This instrument is located in a Class II A2 Biosafety Cabinet to allow for BSL-2 plus research activities. These instruments are operated by qualified individuals on a pre-scheduled basis.

*Analysis Facility.* The primary analytic facilities of the core contain one BD Fortessa X-20 SORP analytic instrument. The Fortessa is a flexible and highly adaptable bench top analyzer. It contains five fixed-aligned, air-cooled lasers: red (637nm), green (532nm), blue (488nm) and violet (405nm) and UV (355nm). In its present configuration, the analyzer is capable of performing twenty parameters (forward and side scatter plus eighteen-color flow cytometry). The Fortessa has an increased sensitivity and flexibility due to the polygonal optical pathways that maximize signal detection from each laser illuminated beam spot. It can yield more information from each sample and rare event analysis is more accurate and efficient because of the increased flow rate and the digital acquisition system. The Fortessa is equipped with an HTS unit that allows acquisition of samples automatically from 96 and 384 well plates. Additionally, it is equipped with BD FACS flow supply systems to automate fluid handling. The core provides training to NSU researchers and students so they are able to operate these instruments unassisted by core staff.

**b. Genomics Core.** The state of the art Genomics Core facility provides high quality services that include whole genome sequencing, exome sequencing, transcriptomics, and gene expression analysis by using high performance real-time PCR, Illumina DNA/RNA library preparation, and Illumina Next Generation Sequencing. The high sensitivity equipment has the ability to profile low number of cells, small tissues, or small volumes of blood. The 840 sq. ft. facilities consist of dedicated laboratories for RNA/DNA extraction, pre- and post-PCR accommodations, an automated sequencing library prep room, high-throughput sequencing, and several instrumentation suites. In addition to performing these highly technical assays, the core staff also advises researchers in many areas such as proper sample and library preparation methods to obtain high-quality data; and supports collaborative efforts across multi-disciplinary sciences for both research and clinical applications.

The Genomics Core contains adaptive focused acoustics technology utilizing a Covaris E220 Focused Ultrasonicator for shearing DNA. In addition, the core has two high performance qPCR platforms. These systems include the Roche light Cycler 480 system with qualitative and quantitative methods for gene detection, gene expression analysis, genetic variation analysis and array data validation and the Agilent AriaMx with fully integrated quantitative PCR amplification, detection, and data analysis system. Evaluating DNA/RNA quality, quantity and size can be achieved using Agilent BioAnalzyer, TapeStation and Qubit instruments. The Illumina NextSeq500 platform for Next Gen Sequencing is available and direct, multiplex gene expression data obtained using NanoString’s novel digital color-coded barcode technology on the nCounter Analysis System.

**c. Bioinformatics Support.** Bioinformatics support for identifying transcriptional signatures and custom project analysis is offered by the Genomics Core Facility.

**d. Imaging Core.** The Imaging Core facility provides users with state-of-the-art imaging instrumentation, and initial training. The principal assets of the core consist of the following: a confocal microscope (Zeiss LSM 880 with Airyscan) and an Inverted automated imaging system (Life Technologies EVOS).

*Confocal Microscope.* The Zeiss LSM 880 is equipped with 3 fluorescent channels plus 1 transmitted light channel including a GaAsP detector and full incubation. It has a fully motorized objective turret housing 10X, 20X, 40X and a 63X objective with DIC available. The LSM880 employs the easy to use Zen software platform for acquisition and analysis of imaging data.

*Auto Imaging System.* The EVOS FL Auto Imaging System is a fully-automated, digital, inverted multi-channel fluorescence and transmitted light imaging system. The EVOS comes equipped with 4X, 10X, 20X, and 40X with the ability to do phase contrast. It can image DAPI, GFP, & RFP. It has a fully incubated stage allowing for time lapse imaging experiments.

**e. Cell Therapies Core (CTC).** The CTC occupies approximately 720 sq. ft. of restricted-access laboratory space on the 4th floor of the Center for Collaborative Research on the Davie Campus of Nova Southeastern University. This HEPA-filtered facility contains 10 Heracell copper interior split-door CO2 and hypoxic tissue culture incubators for stem cells and standard cultures, 2 inverted light microscopes, a fluorescent microscope with digital camera, refrigerated centrifuges, automated cell-counters, and seven biosafety cabinets. The CTC is equipped with advanced cell and tissue processing instruments such as the Miltenyi GentleMACS Octo Dissociator, AutoMACS Pro Cell Separator, GE Wave Bioreactor, GE Akta Pure FPLC and NanoSight 300. The CTC is capable of pre-clinical evaluation and optimization of cell therapy products as well as stem cell differentiation (including embryonic, hematopoietic and mesenchymal stem cells) in addition to long term culture and expansion of various cell lineages and cell lines. CTC provides high-quality culture services through a trained and dedicated staff.

**f. Vivarium.** The state-of-the art Vivarium occupies approximately 12,000 sq. ft. of space on the 6th floor of the Center for Collaborative Research. Total capacity for the entire Vivarium is approximately 10,000 mice, 1,750 rats and 72 rabbits/guinea pigs. The entire Vivarium is outfitted with Tecniplast greenline IVC cages. Each room is equipped with temperature and light controls and can ventilation for VHP to create an SPF environment. The Vivarium contains two separate animal holding areas for animals: a conventional suite and a barrier suite. It contains a centralized cage wash facility, procedural space, housing for conventional rodents as well as barrier housing for immunodeficient and sterile rodents. Access to the vivarium is limited to those who have received Institutional Animal Care and Use Committee (IACUC) certification.

*Regulatory Compliance*. All research involving animals at the facility is approved by the NSU Institutional Animal Care and Use Committee (IACUC). The Committee is responsible for ensuring proper care, use and humane treatment of animals used in research, testing and education. Animals are not received until IACUC approval is granted. The NSU IACUC Committee is composed of 7 individuals. All research protocols receive a thorough review. Protocols may be approved, or require modifications to secure approval, or approval withheld. In addition to the approval of research applications, the IACUC also inspects all research and animal facilities, and provides semi-annual evaluations of the animal care program.

NSU currently has an OLAW assurance in place and is accredited by AAALAC International demonstrating NSU’s commitment to setting, achieving and maintaining high standards for animal care and use and also to animal welfare in science. The animal care program is in compliance with the standards for animal care outlined in the Guide for the Care and Use of Laboratory Animals 8th ed. and the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals.

*Animal Housing.* All rodents are housing in individually ventilated cages (IVCs) and all housing meets the Laboratory and Animal Biosafety Level 1, 2+ requirements recommended for animal studies in the CDC/NIH publication "Biosafety in Microbiological and Biomedical Laboratories". Protective clothing and equipment are strategically located in the facility. The items available include disposable laboratory gowns, hair bonnet, shoe covers, gloves, surgical masks, plastic face shields, and safety goggles.

*Description of Conventional Animal Facility at NSU*. The Conventional Suite is approximately 1,360 sq. ft. and contains a quarantine room, 3 animal holding rooms, a procedure room, a surgical suite, an X-ray room, and a necropsy room. The 3 holding rooms can accommodate 4 double sided racks and 12 single sided racks for mice or rats. Each of the holding rooms is equipped with animal transfer stations and access to a procedure room and a surgical suite.

*Description of Barrier Animal Facility at NSU*. The Barrier Suite is approximately 1,350 sq. ft. Access is gained through a controlled bio-exclusion air shower and airflow pattern. It contains 3 holding rooms that can accommodate 6 double-sided racks and 9 single sided racks for mice or rats. Each of the holding rooms is equipped with animal transfer stations and access to a procedure room. The Barrier Suite also contains a dedicated autoclave. Each procedure room is equipped with a biosafety cabinet and snorkel for scavenging gas and has access to a pass-through autoclave and cage wash system. Exhaust air is ducted directly from the facility to outdoors. Each animal holding room has an animal transfer station and ventilated rack caging system.

*Routine Veterinary Care and Husbandry****.*** The center has a well-trained, experienced animal caretaker staff for the care and maintenance of rodents. All animals in these studies will be monitored on a daily basis to document their clinical appearance and general health status by trained animal care staff. Veterinary care at the NSU animal facility will be provided by the attending veterinarian that is board certified in laboratory animal medicine.

*Animal Records.* Animal records are maintained by the animal care staff according to NSU’s OLAW assured animal care and use program and by the researchers according to the approved IACUC protocol**.** NSU has an onsite information technology (IT) group that provides support for all IT operations at the Institute.

*Euthanasia.* Animals will be monitored as indicated in the approved IACUC protocol. At the completion of the experiment, animals will be euthanized according to the AVMA Guidelines for the Euthanasia of Animals (2013 edition).

*Imaging Room.* The Barrier Suite possesses an imaging room containing a Bruker Xtreme II that provides five imaging modalities: bioluminescence, fluorescence, Radioiotopic imaging, Cherenkov radiation and high speed digital X-ray. Researchers will also have access to a Bruker Skyscan 1176, which is a high performance standalone in vivo micro-CT for preclinical research.

*Other core facility resources:*

1. **Histology/Irradiator.** For irradiation of feeder cell layers, the institute has a Rad Source 2000 X-Ray irradiator housed on 6th floor of the CCR. For frozen section and histology processing, there is a histology/pathology suite that contains a fume hood for sample processing and a Cryostat for preparing frozen sections.
2. **Glasswash/Autoclave Facility**. For cleaning and sterilization of glassware and other items there is a common glass wash facility and autoclave suite maintained by NSU.
3. **Bacterial prep suite**. The main biochemistry/molecular biology lab houses the bacterial prep suite for the preparation of large/mid-sized preps of plasmid. This room contains centrifuges, bacterial incubators, a sonicator a microfuge and heated shakers for bacterial culture.
4. **Common Equipment.** There is an Accuwash ELISA plate washer, a luminometer, a BioRad Bioplex 200 Luminex system, ELISPOT reader, and Azure C400 Gel and Blot imaging system. A Beckman Ultracentrifuge for viral and protein preparations as well as various other common shared instruments are available to investigators.

***Other Resources***

The **NSU Health Professions Division Building** houses the *Statistical Support Center,* established by NSU’s Kiran C. Patel’s College of Allopathic Medicine. The center provides comprehensive and high-quality statistical support to researchers in the areas of basic and translational research, clinical trials, and population studies. Statistical services including advanced data analytic software are available to faculty, primary researchers, graduate students, and staff to support research endeavors and to assist with the publication process. The center is comprised of staff and collaborating faculty across various disciplines, including psychometricians, bioinformaticians, economists, epidemiologists, biostatisticians, survey researchers, and clinical trial specialists. In addition to one-on-one consultations, the center also offers workshops and seminars in statistical design and analysis. Center consultants have deep expertise in R, Python, SAS, SPSS, and Stata. In addition, they advise clients on the use of other statistical and technical software packages, including HLM, JMP, Plus, Matlab, Mathematics, NQuery, Perl, Julia, LaTeX, GraphPad, Tableau, IVEWare, and SQL. Also in the HPD building is the *NSU Publishing Support Group* which provides writing, editing and publishing assistance.

Nearby is the **Health Professions Division (HPD) Library**which provides both digital and print resources to support the curricula of the eight colleges of the Health Professions Division. HPD Library resources have evolved over time to digital format rather than print, allowing 24/7 access to all resources for all users. Currently the collection includes more than 25,000 print volumes, 16,000+ medical/health specific current journals (out of 300,00+ NSU Libraries subscriptions),1000+ electronic textbooks and supplementary monographs, 65 medical/health specific bibliographic and clinical databases and various other formats. The library also provides a well-equipped studio for production, video editing, individual and small group projects; GoToMeeting access; and other tools for enhancing instruction (including full access to all LYNDA videos). The library complex includes 51 individual/small group study rooms; a 3D printing room; onsite technical help for both hardware and software; iPads, apps and laptop computers for checkout; collaboration space with digital tools. Out of the staff of 24, nine are full time reference/research ALA accredited librarians assigned to each college and program within HPD to provide personalized assistance and instruction.

On the other side of the NSU campus is one of the largest libraries in the southern United States; the **Alvin Sherman Library, Research, and Information Technology Center**. The 325,000-square-foot building is a joint-use facility with the Broward County Board of County Commissioners. It serves students, faculty and staff members of NSU, as well as anyone who works, lives or goes to school in Broward County. The five-story state of the art facility contains the *University Writing and Communication Center*, several electronic classrooms, twenty-five group study rooms, a large seventy-five seat collaborative study room, a digital media lab, a “makerspace” lab, a large telepresence room, a café, and service desks with librarians and staff trained and ready to serve library users. The library experience is enhanced by a premier collection of art including the *NSU Glass Garden*, created by glass artist Dale Chihuly specifically for the Sherman Library, The Craig and Barbara Weiner Holocaust Reflections and Resource Room, as well as a gallery which offers exhibits throughout the year. At the second floor reference desk, patrons can receive various services in person, online or by phone. Adjacent to the Library, is the 500-seat Rose and Alfred Miniaci Performing Arts Center which enriches university curricular support and the quality of life in South Florida. Overall, the university’s libraries house more than 1 million items augmented by interlibrary loan agreements which provide access to a wide range of materials from other libraries nationally and internationally. The library features a special section for grant and foundation resources, in cooperation with the New York-based Foundation Center, serving the research needs for people who apply for grants and solicit funds from foundations. NSU students, staff and faculty may use any of the four libraries on campus as well as all of the digital resources available.

NSU’s **Belonging, Equity, Diversity, and Inclusion Advisory Council (BEDI)** has as its mission to guide the university toward inclusive excellence. This is accomplished by cultivating and supporting the ongoing development and implementation of processes, procedures, and programs that promote greater belonging, equity, diversity, and inclusion throughout all aspects of the institution. It endeavors for all members of NSU to feel empowered to pursue their full potential and do their very best work. BEDI is comprised of more than 40 members appointed by NSU Deans and Vice Presidents as representatives for their respective college and administrative unit. Notable accomplishments include establishing a BEDI speakers bureau and talk series, applying for DEI-related grants, and creating a new exit survey to gather information relating to DEI.