

FACILITIES AND OTHER RESOURCES

Environment: The Iowa Neuroscience Institute (INI) opened in 2017, supported by a \$45 million gift from the Roy J. Carver Charitable Trust and additional backing from the Carver College of Medicine. The INI is dedicated to facilitating radical innovation in the diagnosis and treatment of brain disorders by connecting a community of scientists, clinicians, and trainees solving fundamental problems in neuroscience research. The INI continues to hire new faculty to join its 100+ members, who represent 26 departments and seven schools, providing abundant opportunities for collaboration. Additionally, it hosts weekly INI collaboration seminars, which are designed as a forum for lively discussion on ongoing experiments, among postdoctoral scholars, students and faculty members. The INI also sponsors weekly meetings, which vary in format from journal clubs to presentations by guest speakers from outside the institute. Overall, the environment at the University of Iowa is designed to promote collaborations between scientists across disciplines, and breakthroughs in translational brain research.

Laboratory: The laboratory of Dr. X hosts dedicated bench space for 6-8 people on the second floor of the Pappajohn Biomedical Discovery Building (PBDB), as part of the Pappajohn Biomedical Institute. The laboratory is part of an open floorplan, with multiple productive INI laboratories connected to maximize resource sharing and collaboration. Bench space is used for the building of aaa arrays, histological verification of bbb and virus injection, single-cell RNA-Seq experiments, and molecular validations. Extra office space houses two computational analysis stations. Surgical implantation and behavioral analyses will be carried out within the Neural Circuits and Behavior Core (NCBC), which is located in the same building (see below). Within this core, the X laboratory has a dedicated room (~50 sq ft) for running experiments. The physical location of the laboratory allows for daily interactions with numerous experts in neurophysiology, single-cell RNA-Seq, and behavioral analyses.

Animals: An AAALAC-accredited animal facility is overseen by the Office of Animal Resources and the Institutional Animal Care and Use Committee, and is maintained in accordance with all NIH guidelines for the humane care of laboratory animals. This office provides consultation services 24 hours per day, and is administered by board-certified laboratory-animal veterinarians.

Office and Conference rooms: Dr. X's office is located within the laboratory; this is conducive to productivity and oversight of the proposed research. The offices of other investigators are also nearby, facilitating collaboration. The first and second floors of the building house two 240 sq-ft conference rooms, equipped with desktop computer, a large screen, and a Skype microphone and camera to facilitate communication with collaborators across the world. Additionally, two seminar rooms are available for formal presentations.

Cores: The University of Iowa provides multiple core facilities that offer expert advice and collaboration. The most critical of these for the purposes of this proposal are the following:

Neural Circuits and Behavior Core: This new facility (~1,138 sq ft) is housed in the barrier animal facility in PBDB and provides a variety of behavior testing systems. It houses equipment for state-of-the-art behavioral analysis, including: operant conditioning, tethered or telemetric EEG/EMG recording, and rigorous behavioral monitoring. Data and video analysis systems include Noldus Ethovision software, a wide variety of behavioral equipment with multiple cameras, and dedicated computers. Additionally, the NCBC houses a fully-equipped surgery room, including two Kopf stereotactic frames with homeothermic monitoring systems, a Germinator 500 dry bead sterilizer, two Harvard Apparatus microinjection pumps, two isoflurane vaporizers, a Leica S4E dissection stereomicroscope, and a perfusion pump. This equipment is used for various surgical procedures including cannula implantation, virus injection, and electrode placement. Staff of this core are available to consult on all aspects of behavioral, *in vivo* electrophysiological, and imaging experiments any time from initial planning to data analysis stages.

Viral Vector Core and Genome Editing Facility: The Viral Vector Core (VVC) produces and distributes viral vectors for gene expression. The VVC provides all services required in the design and construction of a wide variety of custom viral vectors. The core also maintains a large catalog of "off the shelf" vectors for expression of common markers (e.g., Cre, GFP) without the need of a material transfer agreement (MTA). The VVC works

with Adenovirus, Adeno-associated virus, Helper-dependent Adenovirus, lenti-virus, Vaccinia virus, Baculovirus, and others.

Central Microscopy Research Facility: The Central Microscopy Research Facilities (CMRF) offers a wide variety of research services, educational/training opportunities, and instrumentation within two campus locations. The main laboratory, located in Eckstein Medical Research Building within the College of Medicine, emphasizes imaging of biological samples by offering epi- and confocal fluorescence microscopy as well as scanning, transmission, and freeze fracture electron microscopy. CMRF instrumentation includes a STED super-resolution microscope, a TIRF microscope, an epifluorescence microscope with motorized X-Y-Z stage and environmental chamber for multi-RO1 time-lapse microscopy. The CMRF 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 JEOL JEM 1230 for TEM and Hitachi S-3400N for SEM. A Hitachi S-4800 FESEM is available for high-resolution imaging of sample surfaces. The CMRF also provides all the instruments and materials for routine histological processing, staining, and visualization for both frozen and aldehyde-fixed tissue. In addition, the CMRF maintains licenses and expertise in data analysis with the Bitplane Imaris software and Fiji/ImageJ open-source package. The CMRF supports both the experienced and novice investigator and provides training for independent use of resources. Alternatively, all or parts of a project can be handled by the staff. Major instrumentation within the CMRF is available 24 hours a day and 7 days a week.

Biomedical Research Store: The Biomedical Research Store provides University of Iowa research investigators easy procurement of common molecular and cell biology enzymes, reagents and kits. Large volume contracts enable the store to negotiate very low prices as well as eliminate all shipping and packaging fees.

Biochemistry Stores: Biochemistry Stores is a part of the Biochemistry Department of the Carver College of Medicine at the University of Iowa. As a research supply storeroom that purchases and dispenses nearly \$3 million per year in inventory, the Biochemistry Stores services: all University of Iowa research laboratory units, units of the University of Iowa Hospitals and Clinics, University of Iowa students, Veterans Affairs Medical Center, and any other facilities having funding through the University of Iowa. Biochemistry Stores stocks a broad range of research chemicals, labware, glassware, expendables, and other necessary research supplies, and uses high sales volume to negotiate the purchase of the highest quality inventory at the lowest possible prices. Products are dispensed on a walk-in basis in a quick and efficient manner.

Scientific Equipment Maintenance and Repair Shop: Aids in the repair and design of items required for behavioral and neurophysiological studies.

Iowa Institute of Human Genetics (IIHG): The Iowa Institute of Human Genetics (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 interrogate large panels of genes implicated in a variety of genetic diseases. This initiative, undertaken in partnership with outstanding UIHC clinicians, facilitates genome-phenome integration and cutting edge personalized genomic medicine. Patients seen from throughout the USA 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, 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 and patients and their families about genetics testing and genetic diseases.

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