@UIowaNeuro Notes

May 2021

When I think about the growth of the INI over our first five years, one vital piece has been the development of our research cores. The Neural Circuits and Behavior Core and Iowa NeuroBank Core were always top of mind as we planned for how to support neuroscience research and bring our community of scientists together.

Centralizing these research capabilities gives access to technology and enables labs to do things they wouldn't be able to do individually. Our core directors, **Shane Heiney**, and **Queena Lin**, work across the INI allowing individual labs to share in their expertise. At the most basic level, it's also a more efficient use of space and resources.

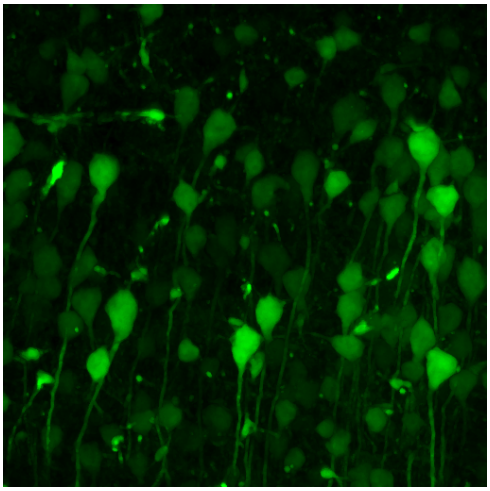


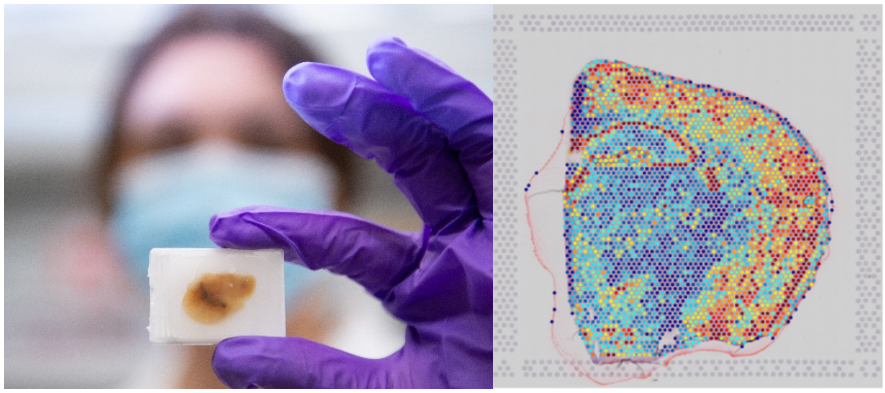
Image Credit: Joseph Glykys

The Neural Circuits and Behavior Core gives INI researchers access to cutting-edge experimental advances for the imaging and manipulation of neural circuits as well as behavioral analysis in both rodent and human subjects. The NCBC brings together a wide range of equipment and expertise, from standard rodent behavioral assays to advanced imaging and stimulation systems. Highlights of equipment recently acquired under Shane's leadership include two-photon and light sheet microscopes, devices for fiber photometry and optogenetic stimulation, touchscreen mouse operant chambers, wireless mouse EEG systems, and a human EEG system that is compatible with TMS equipment. INI researchers are using NCBC equipment to study a broad array of neurological disorders from the molecular to network level.

Just opened last summer, the Iowa NeuroBank Core is already making strides in consolidating a biorepository of human brain specimens from more than 200 brain donors, dating back to 1989 with **Nancy Andreasen's** schizophrenia research. INI researchers and collaborators have access to both neurosurgical and postmortem tissues for better understanding of the basic biology of the human brain and the impact of brain disorders.

The NeuroBank Core also generates human postmortem tissue-derived fibroblasts for patient-specific cellular and tissue models. New equipment to support this work includes two ultra-low temperature freezers in the BSL2 and BSL3 facilities, Olympus VS200 Slideview Research Slide Scanner, Class II/Type A2 Biological Safety Cabinet, Dry Heat Sterilization CO_2 Incubator, EVOS XL Core Imaging System, and Scepter 3.0 Handheld Automated Cell Counter.

Under Queena's leadership, the core is taking INI into brand new research areas with access to new technologies in spatial omics, including 10X Genomics Visium spatial transcriptomics (*image at right*), a collaboration between the Iowa NeuroBank Core, Central Microscopy Research Facilities, and the Iowa Institute of Human Genetics Genomics Division. This new capability to study local changes in gene expression in tissue sections and to identify what cell types or brain regions are impacted by a disease, a genetic alteration, or a drug could be a game changer for our understanding of the human brain.



Additionally, the NeuroBank has launched the Iowa Neuro-COVID registry to investigate the impact of the novel coronavirus SARS-CoV2 on the brain. To date, the core collected more than 20 cases of COVID-19 during this pandemic, including fixed and fresh-frozen brain tissues. These tissues will provide insight into the neuropathological impact of SARS-CoV2 on the human brain across the lifespan.

Together with the well-established cores housed in the Carver College of Medicine, including biomedical imaging, central microscopy, and the IIHG genomics division, our INI research cores are vital for individual research projects and strengthen our applications for program project and center grants. Let's keep talking about ways these resources can support our continued innovation. As always, our best ideas will come from collaboration.