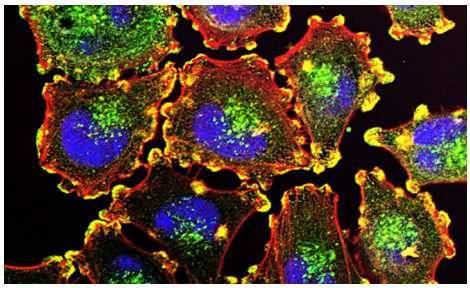
Precision Medicine Innovation Co-Laboratory: An OHSU/PNNL Collaboration

Our History

Oregon Health and Science University (OHSU) was initially founded in 1887 as the University of Oregon Medical Department in Portland, Oregon. Today, OHSU encompasses not only a state-of-the-art School of Medicine, but also the College of Pharmacy, the School(s) of Nursing, Dentistry, and Public Health, as well as top-ranked Oregon adult and children's hospitals.

The Precision Medicine Innovation Co-Laboratory—or PMedIC—was launched in 2018. This partnership between OHSU and Pacific Northwest National Laboratory (PNNL) offers collaborative research and educational experiences for staff, faculty, clinicians, and students at the campuses of both institutions. Our mission is to generate, interpret, and apply multidimensional patient data, such as genetic, proteomic, and metabolic profiles, and integrate this information with imaging and clinical results to customize disease treatment and improve human health.

Research at OHSU

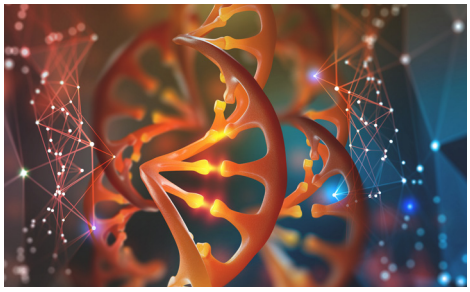


Behavioral Neuroscience

Improving understanding and treatment of brain illnesses, post-traumatic stress disorder, addiction, schizophrenia, Alzheimer's disease, and mood disorders.

Biomedical Engineering

Developing and using measurement and data science platforms and novel devices to solve unmet clinical needs in the areas of cardiovascular and infectious diseases, rehabilitation medicine, and cancer.

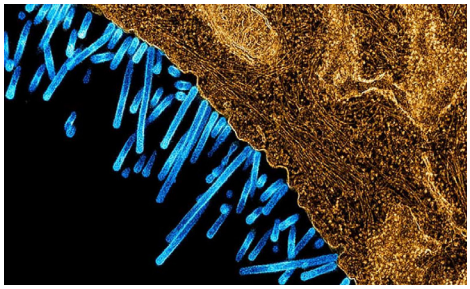


Cell Developmental & Cancer Biology

Multi-disciplinary environment addressing questions regarding cell structure, organelles, life cycle, differentiation, and regulated communication between cells and extracellular signals and cues.

Chemical Physiology & Biochemistry

Applying chemical and structural biology to systems physiology, pathophysiology, and medicine in order to identify mechanisms of disease and develop therapeutics.



Molecular & Medical Genetics

Leaders in rare disease research focus on molecular, cancer, developmental, medical, biological, quantitative trait genetics, gene therapy, molecular diagnostics, and cytogenetics.

Molecular Microbiology & Immunology

Understanding the mechanisms underlying microbial interactions with the host immune system and the mechanisms that hosts use to defend themselves against pathogen attack.

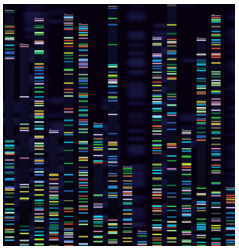
Human & Clinical Investigations

OHSU scientists engage in the full spectrum of translational research, from studies of individuals and patients, to clinical research, to population health.

Expert Core Facilities and Shared Resources

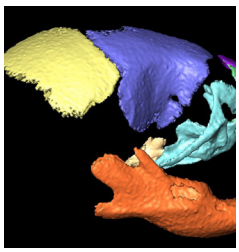
Advanced Imaging Research Center (AIRC)

Faculty at the AIRC are involved in cutting-edge research in magnetic resonance science and technology. Services and equipment facilitate a wide range of research topics, from mechanisms of attention in patients with ADHD, to exploring animal models of multiple sclerosis in primates.



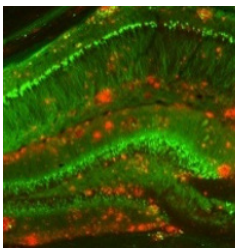
The Integrated Genomics Laboratory

The Massively Parallel Sequencing Shared Resource offers a variety of DNA and RNA library preparation services, such as ChIP-seq to analyze protein interactions with DNA, DNA exome capture, and single cell RNA sequencing with the 10x Chromium system; major equipment includes Illumina NovaSeq 6000.



Small Animal Research Imaging Core

This core provides researchers with state-of-the-art *in vivo* imaging technology. Components of the facility include biophotonics, microPET/SPECT/CT, ultra-high frequency, and small animal ultrasound imaging.



Transgenic Mouse Model Core

This core assists researchers with the development of genetically engineered mouse models of human diseases. Services include generating transgenic mice, conventional knock-outs, and CRISPR/cas9 knock-outs or knock-ins.

Example Projects involving OHSU and PNNL Collaborations

PACIFIC NORTHWEST CRYO-EM CENTER

State-of-the-art electron microscopy user facility funded by the National Institutes of Health Common Fund serves researchers from a diverse range of backgrounds to tackle the most challenging scientific problems and train the next generation of cryo-electron microscopy specialists and users.

UNDIAGNOSED DISEASES NETWORK METABOLOMICS CORE

Integrating analysis and bioinformatics with clinical and genetic expertise to link novel metabolites or patterns of metabolites to underlying metabolic and genetic differences, as well as clinical signs and symptoms. This knowledge is translated into specific clues revealing genetic causes for a patient's disease.

PROTEOGENOMIC TRANSLATIONAL RESEARCH CENTER FOR CLINICAL PROTEOMICS

Combine deep and broad measurements of protein and phosphoprotein abundance from *ex vivo* experiments using primary leukemia cells from patients with acute myelogenous leukemia to model the effects of targeted therapeutic agents on the activation state of key signaling pathways.

How do I collaborate with OHSU?

Contact the co-directors to share your science challenge. We will facilitate an introduction to the most appropriate collaborator(s) at OHSU. We can also facilitate in-person visits and the development of a small pilot project, if needed. OHSU will work with you to design a proof-of-principle experiment; successful pilot data generation will ideally lead to a joint grant proposal, which we can help facilitate. OHSU also has many graduate students and postdocs with interests that align with PNNL, so you may also consider reaching out to be a mentor.

Who can I contact?

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