***Institute of Neuroscience******(ION):*** The Institute constitutes a group of biologists, psychologists, mathematicians, and human physiologists that all study fundamental questions in neuroscience. The majority of the 27 ION labs are located within one building (Lewis Integrative Science Building (LISB)), and open onto an atrium connecting them with Cognitive Neuroscience laboratories, including an in-house dedicated fMRI center, and the Neuroinformatics Center. Research interests are grouped into four main areas.

The developmental biology program combines research activities centered in ION with those in the Institute of Molecular Biology and the Institute of Ecology and Evolution. Members of all of these laboratories actively share information and resources in this diverse and rapidly moving field. In addition to a graduate research training program, a weekly journal club, and joint research group meetings, the developmental biologists participate in a yearly symposium on a topic of interest selected by graduate students in the participating laboratories.

The systems neuroscience faculty share an interest in the mechanisms by which neural circuits produce perception and behavior. The model organisms and techniques they use are highly diverse with individual labs typically integrating multiple approaches.

The computational neuroscience group is highly collaborative, and trainees often receive shared supervision between computational and experimental labs on joint projects. The group aims to understand how the collective activity of large networks of neurons leads to the emergence of cognitive function and behavior, how information processing in the brain arises through learning and plasticity, and how it is modulated by context and behavioral states. To model information processing in the brain, researchers employ a combination of mathematical approaches from theoretical physics and applied mathematics, together with brain-inspired artificial intelligence models used to emulate the complex ways in which neural circuits learn and represent information. They also develop and deploy new machine learning tools to analyze large neural datasets recorded from behaving animals. In collaboration with experimental labs at the UO and other institutions around the world, the researchers design new experiments to test models and develop theories of brain function, cognition and learning.

The motor and cognitive neuroscience faculty are from human physiology and psychology, and they investigate action and cognitive control, executive function, attention, perception, and memory in healthy and diseased human populations. Research interests focus on motor control, perception and action, episodic memory, neural control and biomechanics of skilled action, motor neuroscience of health and disease, and the flexible use of memory.

ION’s regular seminars are open to the whole UO community and provide outstanding exposure to a diverse set of topics and methods in neuroscience. Journal clubs are grouped around particular focus areas of neurobiology/systems neuro, zebrafish, cell and developmental biology, neurons, circuits & behavior, computational neuroscience and mega motor.