Facilities and Resources

The Northern Rockies Center for Hydrodynamics (NRCH) provides advanced biophysical services for solution-based molecular interaction, structure, function, and composition characterization, focusing on analytical ultracentrifugation and refractometric and UV-visible spectroscopy. The NRCH occupies 270 sq. ft. of laboratory and office space (012 and 012A) in the basement of the Interdisciplinary Science Building (ISB). The two rooms are connected by an internal pass-though entrance. The lab is equipped with house chilled water and DI water, multiple static internet ports on two separate 1,000-baseT (1 Gbps) networks, one on the UM-wide commodity internet, the other on a private VLAN dedicated for the NRCH and the nearby Integrated Structural Biology Core (ISBC) facility laboratory instrument equipment located in ISB 016B. The lab has adequate air handling and temperature control to maintain a constant ambient temperature of 68 ^{o}F. ISB 012 is accessed from a central corridor via a secure keypad entrance. Both rooms have laboratory benches and cabinets and an office space with a dual monitor workstation, connected to an AMD Epyc 7742 supercomputer (128 cores, 512 GB RAM, and 72 TB RAID5 SATA storage) running Oracle Linux. The supercomputer is connected to both networks via separate 1Gbps ethernet ports, and provides a firewall and network address translation for the laboratory VLAN. The laboratory VLAN also connects to a UV-vis spectrophotometer (Genesys S10) and a Beckman-Coulter Optima AUC with Rayleigh interference optics and UV-visible multi-wavelength absorbance optics (190-800 nm). The NRCH provides its own website and a MYSQL relational database, the UltraScan hydrodynamic modeling framework, including batch processing of AUC data analysis for 2DSA, Monte Carlo, genetic algorithm, and PCSA analysis. Remote access is offered through reverse ssh tunnel and ssh-tunneled VNC service.

Major Equipment:

- Beckman-Coulter Optima AUC with Rayleigh interference optics and UV-visible multi-wavelength absorbance optics (190-800 nm)
- An50Ti 8-position rotor (50 krpm max)
- An60Ti 4 position rotor (60 krpm max)
- 8 Beckman cell housings with sapphire windows and 12 mm Epon Charcoal double-sector centerpieces
- 8 Nanolytics cell housings with sapphire windows and 12 mm and 3 mm titanium double-sector centerpieces, counterbalance and AUC Solutions calibration centerpiece and spacers
- Nanolytics optical alignment tool
- Nanolytics torque station for cell housings
- Cuvette washing station and vacuum pump
- Genesys S10 UV-visible spectrophotometer (200-750 nm, 1 nm increment) with quartz cuvettes
- Cuvette washing station
- VLAN connected laptop computer for spectrophotometer
- AMD Epyc 7742 supercomputer (128 cores, 512 GB RAM, and 72 TB RAID5 SATA storage) running Oracle Linux.