

Thermofluids Laboratory (2nd Floor of Steinman Hall)

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This is a 300 m² laboratory is a well-equipped wet laboratory with two fume hoods and full utilities such as compressed air, three-phase 220 Volt AC, steam boiler, and 20-m of lab benches and storage cabinets. Several two-phase flow and heat transfer flow loops are available for determining the heat transfer and pressure drop characteristics of gas-liquid mixtures, flow boiling of water and refrigerants at pressures up to 10 bar, as well as heat transfer to complex fluids such as PCM nanoemulsions. These flow loops are equipped with a gear pump, flow meter, heat exchanger, Ohmically heated test section, PC-based data acquisition system and a 14 kW DC power supply. A gamma-ray source (5 milliCurie Cs-137), multiple NaI scintillation detectors, and a Multichannel Analyzer are available for gamma densitometry measurements. This densitometer system can be traversed horizontally or vertically to obtain radial and axial distributions of gas volume fractions and solid particle volume fractions in small and large pipes.

Flow visualization equipment includes two high speed video cameras capable of 10,000 FPS at 200 px by 200 px resolution.

For visualizing flows in opaque flow channels, a 100 keV X-ray source (Oxford Instruments) and an imaging sensor (Hamamatsu Photonics X-Cube) are also available.

A microfluidics laboratory has two Confocal Displacement Sensors (Keyence) that can be used to measure thicknesses of transparent liquid films down to several microns.

A high temperature heat transfer lab is located in the basement of Steinman Hall with two high pressure/high temperature gas flow loops and test sections for investigating forced and natural circulation flow and heat transfer of gases such as helium. This facility is used for thermal-hydraulic and safety studies of Gen IV High Temperature Gas Reactors.