**Laboratory 2: Hot-Wire Anemometry Calibration and Jet Flow Experiment Notes**

Since not all of you were able to conduct the entire calibration and actual experiment, I wanted to write you all a note to ensure everyone is on the same page. The data posted is a compilation of numerous groups doing a portion of this experiment.

CALIBRATION:

A total of three different calibrations of the hot wire were conducted for three different overheat ratios starting with the recommended (1.53) and 0.15 and 0.30 lower than recommended. This calibration was done using the jet calibrator where the wire was placed < 2 mm away from edge. Assuming negligible potential energy gain and velocity in the chamber, applying Bernoulli’s principle the velocity at the exit can be related to the differential pressure between the chamber and atmospheric. For each OHR, there should be 11 calibration points (including one for a zero flow reading), but there appears to be 10 for some. Also, the naming convention is a bit odd for some of the .lvm files for the calibration. For now, assume that the calibration naming convention is the pressure read on the pressure transducer and not accounting for the shift. The transducer has a shift of approximately 0.0032 kPa, but make sure to account for this shift for each data set during processing.

JET FLOW EXPERIMENT:

In the original lab, it was stated that there would be two different Reynolds numbers, at two different heights, for two different OHR. This is now simplified to doing two Reynolds numbers, at two different heights for a SINGLE OHR. The posted data has available calibration data for all three OHR, however, OHR\_1.22 and OHR\_1.53\_2 have both Reynolds numbers and heights. My suggestion would be to use the OHR\_1.22 as I am confident in the group’s traverse was not compromised (i.e. center measurement is actually at the center). For the traverse it is incremented from 45 mm to ~135 mm in increments of 5 mm. The lower height is assumed < 2 mm from the central jet and the higher height is ~ 30 mm from the central jet. In each run, summaries of the volumetric flow is reported (average) with a standard deviation with 120 data points used in this processing. The naming convention for the experiment is as follows:

High\_RE\_High\_H = High Reynolds number and high height

High\_RE\_Low\_H = High Reynolds number and low height

Low\_RE\_High\_H = Low Reynolds number and high height

Low\_RE\_Low\_H = Low Reynolds number and low height

Good luck, and if you have any questions please let Dr. Blunck or I know.