



# Thesis Projects (MIE498 H/Y) 2018–2019

**Title/Topic:**

Where machine learning meets fluids: ML-led microfluidics to optimize industrial fluid formulations

**Description:**

Machine learning is being widely applied for analysis of data, and experimental data, in an ever-increasing number of sectors. Microfluidics has evolved as a suite of methods that can obtain quality, high-throughput data from fluids. The marriage of machine learning and microfluidics is mostly one of data-generator (microfluidics) with data-analyzer (machine learning). This project develops this theme and takes it one step further - the use of machine learning to control the experiments conducted by the microfluidics, that is, embody a largely autonomous ML-led experimental system. There are several globally-significant industrial fluid challenges that we will assess early on (including producing the optimal refrigerant compliant with upcoming 2030 guidelines, brake fluid formulations and additive manufacturing polymer blends) and then focus the project on the combined software and hardware elements. This project will be very demanding, required outstanding academic achievement to date, an interest in pursuing graduate work, and abilities in both software and hardware development.

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