

MEng Project: *CFD modeling of lime kilns in kraft pulp mills*

Project start: fall 2025/ winter 2026

Supervisors: Markus Bussmann (MIE) and Niko DeMartini (CHE)

For an overview of the kraft pulping process, see https://en.wikipedia.org/wiki/Kraft_process.

Lime kilns are direct contact counter-current heat exchangers that burn a fuel at one end and feed wet lime mud (CaCO_3) at the other end. The lime mud travels toward the hot end of the kiln, heats up and CO_2 is driven off, converting the CaCO_3 to CaO .

Over a number of years we've developed a transient 2D gas phase / 1D bed model of a lime kiln using ANSYS Fluent. The model can be tuned for individual kilns at kraft pulp mills, and over the past couple of years we've modeled several industry kilns, including one kiln for over a year of operation. We'd like to build a larger dataset of different kiln operations using our approach. To this end, we're looking for student(s) interested in CFD modeling of these industrial kilns.

If interested, please submit your CV, unofficial transcripts, and a single paragraph describing your interest in the project to Markus Bussmann (markus.bussmann@utoronto.ca).