

Green Fuels and Renewable Energy

The Department has another strong cluster of researchers working towards creating a sustainable biorefinery that utilizes domestically-produced agricultural crops and wastes to produce value-added biobased products, such as, green chemicals and fuels, and green and renewable energy. This includes assembling and integrating a range of process technologies to make optimal use of, and to improve sustainability of Canadian agricultural resources. The research is strongly supported by Agri-Food Canada. This research theme is well integrated with research in mixing of non-Newtonian fluids, another well established research area of our department.

Researchers in this area have access to an Ammonia Fiber Expansion (AFEX) pre-treatment unit, reactors for supercritical extraction, pyrolysis, and enzymatic hydrolysis, computerized batch and continuous mixing setups, a particle size analyzer, chromatographs and a Scanning Electron Microscope, both for conducting experiments and analyses of samples. Simulation and modeling of mixing processes combine both experimental and numerical techniques such as: rheology, tomography, ultrasonic Doppler velocimetry, and computational fluid dynamics.

Since much of the research carried out in this area focuses on the development of new energy resources, the research thrust in this area can be listed under the *Technical Innovation* and the *Energy, Sustainability and the Environment* research themes at Ryerson.