

# The Chemical Reactor Engineering Centre

Engineers at Western are motivated to find innovative and alternative methods for producing energy by inventing environmentally safe chemical reactors and products. This research will become increasingly crucial as stringent environmental regulations emerge regarding restrictions to greenhouse gas emissions and pollutants such as sulphur in gasoline.

## What is the Chemical Reactor Engineering Centre?

Western's Chemical Reactor Engineering Centre (CREC) is a research and consulting laboratory that develops new reactor technologies in close collaboration with the industrial sector. The CREC was founded by Dr Hugo de Lasa in 1988 and has rapidly become one of the best reactor engineering labs in the world, recognized internationally as a centre of expertise and innovation in new chemical reactor technologies and ideas.

The aim of the CREC is to become a leader in pollution prevention and control. The centre is driving and inspiring the development and implementation of inventive products and reactor technologies for the petrochemical, chemical and energy industries, helping them with challenges such as transforming petroleum feedstocks and converting intermediate petrochemical products. Engineers at the CREC partner effectively with numerous industries, government organizations and universities both within Canada and beyond to collaborate on joint research efforts.

## Research

In keeping with the current trend toward using energy sustainably, the CREC continues to produce innovative chemical reactor concepts with new catalysts, reactor designs and measuring tools. Looking ahead, the CREC will concentrate on conceiving and developing new products and processes to address anticipated changes in environmental policy. The Centre's researchers are exploring environmentally friendly processes such as the catalytic desulphurization of gasoline, the reduction of greenhouse gas emissions and the design of novel fuel cells.

CREC engineers have invented a number of cutting-edge devices, including the Riser Simulator for developing next generation catalysts and environmentally friendly gasolines. The Riser Simulator is a novel bench scale batch reactor that closely mimics the conditions of industrial scale reactors. In addition, the CREC has constructed optiprobes for developing novel chemical reactors, the Pseudoadiabatic Catalytic Reactor for generating friendly fuels and, more recently, the Photo-CREC Reactor for eliminating air and water pollutants. The CREC has established a rigorous program of patent application and international marketing, and continues to expand the in-house design and manufacturing of novel prototypes. Researchers at the CREC are not only active in the conception and initial phase of developing innovative reactor concepts, but are also involved in implementing and commercializing them.

## Facilities

The CREC is equipped with bench scale chemical reactors and advanced analytical instruments and computers for simulation, data acquisition and process control. The facilities include the Riser Simulator for FCC studies and catalyst testing, and pilot plants for hydrocarbon synthesis and ultrapyrolysis. CREC engineers also have access to a photocatalytic reactor that destroys organic contaminants in water and air, cold simulators for large scale fluidized beds, bubble columns, three phase fluidized beds, transport line units and downer reactors.

## Notable Achievements

Like many of Western's faculty, CREC's members have been very successful at patenting their inventions, all of which will be licensed and commercialized. The Centre has significantly advanced photo-catalytic reactor technology with the development of improved Photo-CREC-Water and Photo-CREC-Air designs. In 2003, CREC's engineers founded Reactor Engineering and Catalytic (RECAT) Technologies Inc, a Western-affiliated spin-off specializing in developing and commercializing innovative reactor technologies. Perhaps the greatest of the Centre's accomplishments to date is the invention of the Riser Simulator, a valuable experimental tool for helping industries cost-effectively research, conceive, develop and test new catalysts that may become the critical ingredients for much-needed environmentally friendly chemical processes. CREC's engineers have also launched the first electronic chemical engineering journal, the *International Journal of Chemical Reactor Engineering*.



*A reactor at the Chemical Reactor Engineering Centre*

**For more information, please visit:** [www.eng.uwo.ca/crec/](http://www.eng.uwo.ca/crec/)