



NEEDS

\$5 million – for human capital, renovations and new equipment to ensure the ongoing viability of this crucial lab – broken down as follows:

- Endowed lab directorship to attract, retain and support a skilled chemical engineering lab manager and educator;
- Endowed internships to support our undergraduate students and teaching assistantships to support our graduate students;
- New equipment purchases; and
- Lab space renovations and equipment revitalization.

GET INVOLVED

To learn more about the ICE Laboratory and/or to get involved with the project personally or collectively with your classmates, contact:

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**INTEGRATED
CHEMICAL
ENGINEERING**

THE FUTURE OF CHEMICAL ENGINEERING EDUCATION

INTEGRATED CHEMICAL ENGINEERING

The Unit Operations (Unit Ops) Lab is central to the undergraduate Chemical Engineering program at the University of Toronto. While many schools have only computer-based simulations, we still offer essential hands-on education, training, and experience through the Unit Ops Lab. Our industrial-scale equipment distinguishes our program from all others in Canada. Every year in the Unit Ops Lab, over 200 students put key chemical engineering concepts into practice while gaining confidence and career-preparedness.

“I’ve learned so much in such a short period of time. Honestly, by using the new equipment to learn concepts from our curriculum, I feel like I’ve learned the equivalent of three courses in three months.”

KATRINA ROSSALL (ChemE 1T4)



OBJECTIVE

Our objective is to fully modernize the Unit Ops Lab, built in 1948, to create a state-of-the-art **Integrated Chemical Engineering (ICE)** Laboratory that better reflects the complexity of industry and the needs of society while ensuring the relevance and excellence of the education we offer.

IMPACT

ICE will:

- Expose students to the core elements of chemical engineering (fluids, heat transfer, separations, reactors and control systems);
- Offer hands-on, experiential set-ups that are scaled-down plants rather than scaled-up labs;
- Expose students to a fully integrated experience allowing them to go from raw material to final product; and,
- Link core chemical engineering concepts together throughout our undergraduate curriculum while incorporating opportunities for innovation, exploration, data analysis, modeling and simulation.

FACILITIES

The ICE Laboratory will have:

VERSATILE BATCH SYSTEM ZONE

A new facility consisting of 5L, 50L and 100L batch reactors instrumented with state-of-the-art equipment.

BIOENGINEERING ZONE

Includes both a fermenter that enables students to go from the lab bench to industrial-scale operation, and smaller scale experiences like lab-on-a-chip.

WATER TREATMENT ZONE

Incorporating advanced processes in areas such as membranes for nano, ultra and micro filtration, adsorption, UV disinfection, ion exchange and filtration.

FLUID FLOW AND HEAT TRANSFER ZONE

Where students study how equipment is coupled and connected from an energy and mass flow point of view.