

הטכניון - מכון טכנולוגי לישראל

TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY



הפקולטה להנדסה כימית
ע"ש וולפסון
The Wolfson Department of Chemical
Engineering

Wolfson Department of Chemical Engineering Seminar
Lecture Hall 6, Wolfson Department of Chemical Engineering,
Wednesday December 12 at 1:30pm

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From PI to AI, and maybe back

Process Intensification (PI) is becoming a main focus of interest in academia, industry and government. A good example for this is the recently established U.S. RAPID institute*. PI was first introduced by C. Ramshaw from ICI about 40 years ago, focusing on the significant *size reduction* offered by the HiGee technology for distillation using rotating devices. Today it is accepted that PI is any chemical engineering development that leads to a substantially smaller, cleaner, and more energy efficient technology.

Process Intensification technologies include integration of reaction and separation, such as reactive distillation and membrane reactors, the use of novel energy sources such as solar, electrostatic fields and ultrasound, transient processes such as simulated moving beds, equipment for enhanced mass transport such as rotators and specialized inline mixers and equipment for enhanced heat transfer such as micro-reactors. The main focus of PI is thus on equipment and process design, not on novel materials, even if such materials lead to the “substantial” improvement, enabling the intensified process (e.g. membranes in membrane reactors, adsorbents in simulated moving beds etc.).

In this talk we will discuss Process Intensification and its implications for the future of chemical engineering. We will illustrate some of the fundamentals of PI using examples from our work in the energy and pharmaceuticals sectors. Specifically, we will demonstrate intensification of small scale hydrogen production for on-site and on-board power generation, and intensification of pharmaceuticals manufacturing by dynamic optimization of an end-to-end continuous flow plant.

Lastly, we will address the recent surge in Artificial Intelligence (AI) advancements and their potential impact on PI and the chemical engineering field in general.

* <https://www.aiche.org/rapid>

Refreshments will be served at 1:15pm