

## Scientific Program Details for Day 1, Monday, 17 June 2024

### PSE for Digital Sustainability

Chaired by Prof. Benoit Chachuat, Imperial College London

#### Session Synopsis:

This session will explore research gaps, challenges, and opportunities in the topical area of digitally enabled sustainability. A key focus will be how digital technologies may provide critical decision-support in sustainability problems and help boost sustainability. The session will also cover topics related to deploying digital technologies in an industrial context, with a view to delivering zero waste generation and net zero carbon emissions.

#### First Invited Talk

##### Digital Sustainability Tools for Future Chemicals and Fuels

Prof. Gonzalo Guillen Gosalbez, ETH Zurich  
Mr. Iasonas Ioannou, EcoInvent

##### Abstract

The chemical sector seeks to produce greener, yet economically competitive, chemicals. This transition calls for computer-aided tools to quantify potential environmental impacts and find the best decisions to ensure sustainable development. However, the data-intensive nature of life cycle assessments may delay an adoption at scale. The new generation of digital tools, from machine learning to process modelling and optimization algorithms investigated in Process Systems Engineering, may play a pivotal role in supporting environmental assessments and sustainable decision-making. This talk explores the potential role of digital sustainability tools in future chemicals and fuels production. Combining the views from an established background database and academia, we will outline key challenges and opportunities.

#### Second Invited Talk

##### Challenges in Decarbonization and Circularity of Industrial Clusters

Prof. Andrea Ramirez Ramirez, TU Delft

##### Abstract

90% of raw materials used in the chemical industry are of fossil origin. A future industrial system that is independent of fossil resources will require the use of defossilized heat and electricity sources as well as circular carbon sources, such as CO<sub>2</sub>, waste, and biomass, to produce chemicals and materials. Industrial clusters are, however, complex systems with increasingly intertwined processes between and within firms. Such strong interdependences can become a barrier to de-fossilization as any intervention in any single process can affect other processes both at the local scale of an industrial cluster and in the supply chains involved (which are geographically dispersed). In this talk, I will explore key challenges to identify and assess the impact of defossilizing symbiotic industrial clusters.

To go back to the FIPSE-6 Scientific Program, click [HERE](#).