

We hereby invite you to the **CAPEC-PROCESS Annual Lecture 2014**

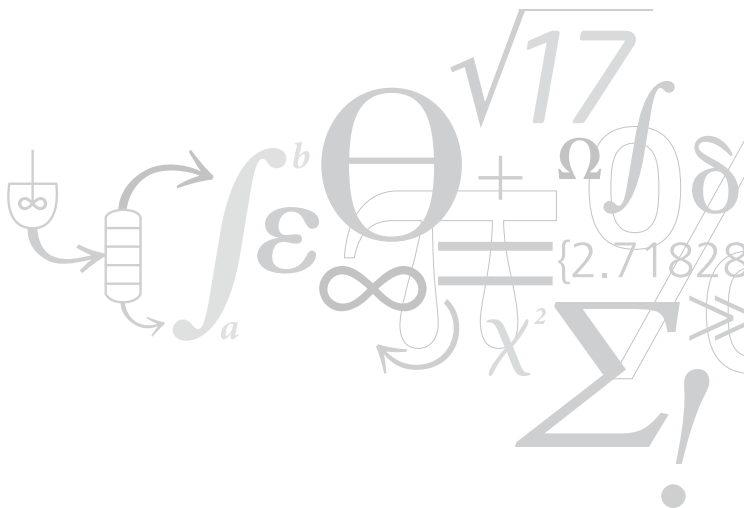
Thursday 11 September 2014

Oticon Hall, DTU, at 2:30 p.m.

Role of Process Systems Engineering in Chemical Engineering

Lecture by: Prof. Ignacio E. Grossmann





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Professor Ignacio E. Grossmann is the R. R. Dean University Professor of Chemical Engineering at Carnegie Mellon University. He was Department Head of Chemical Engineering from 1994 to 2002, and is currently director of the "Center for Advanced Process Decision-making." And, he is a member of the National Academy of Engineering. Major AIChE awards include Computing in Chemical Engineering Award, William H. Walker Award, Warren Lewis Award, and Research Excellence in Sustainable Engineering. He has honorary doctorates from Abo Akademi, University of Maribor and Technical University of Dortmund. He was named "One of the Hundred Chemical Engineers of the Modern Era" by AIChE. His research interests are in the areas of mixed-integer and logic-based optimization, stochastic programming, process synthesis, energy integration, and enterprise-wide optimization.

Abstract

In this talk we give a general overview of the nature of Process Systems Engineering and discuss some current major trends. We also show how this fits in Chemical Engineering and the role it may play in the future. After briefly reviewing the history of Chemical Engineering, we highlight how academic research over the last decade has had a strong push towards science, largely due to emergence of areas such as nanotechnology and biotechnology. However, despite these trends, Process Systems Engineering (PSE) remains a core area in Chemical Engineering that on the one hand has expanded its scope from the process engineering level down to the molecular level, and up to the enterprise and global level. Furthermore, PSE is regaining prominence again due to the increasing importance of the areas of energy and sustainability. Traditionally, PSE has been subdivided into process design, process control and process operations. In this talk we argue why PSE is becoming broader in terms of scope due to future trends.

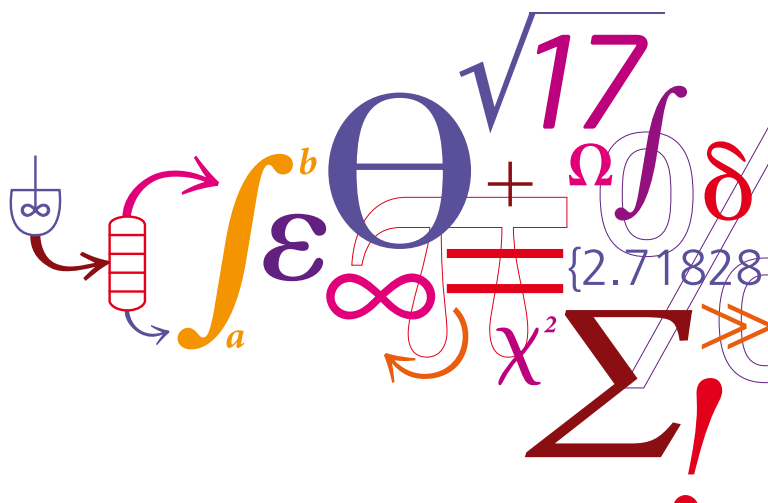
Process Systems Engineering is concerned with the improvement of decision making processes for the creation and operation of the chemical supply chain. Specifically, it deals with the discovery, design, manufacture and distribution of chemical products in the context of many conflicting goals. Furthermore, PSE directly ties to industrial needs from R&D to product distribution. While largely driven by industrial needs, PSE research also deals with fundamental theoretical issues. Science views the discovery and rationalization of natural phenomena as its intellectual challenge. In contrast the intellectual challenges for the PSE area are the discovery of concepts and models for the prediction of performance and for decision making for an engineered system. Science strives to unravel the underlying mechanisms that explain the behavior of a system. In contrast, PSE research strives to create representations and models to generate desirable alternatives, and then select from among them a solution that meets constraints and ideally optimizes an objective.

We describe three major trends in Process Systems Engineering that have emerged over the last decade and that can potentially help the industry to innovate and to remain competitive. First, we describe efforts for simultaneous product and process design, where the emphasis lies in tying the molecular structure of the products with the processing and macroscopic properties of the product. Second, we describe work that is aimed at modeling and optimizing processes for supplying alternative energy sources such as biomass, as well as managing natural resources such as water more efficiently. Third, we describe research efforts in enterprise-wide optimization that are aimed at designing and operating supply chains for the process industry in which planning, scheduling and control can be integrated more effectively. We conclude that Process Systems Engineering is broadening its scope in order to address problems that are of current and future interest.

Participation at this Annual Lecture is free

For registration please contact:

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The lecture will take place at:

Oticon Hall, DTU
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Bygning 101A
2800 Kgs. Lyngby
Denmark