



# LA SECCIÓN DE CIENCIAS FÍSICAS Y QUÍMICAS DE LA REAL ACADEMIA DE CIENCIAS EXACTAS, FÍSICAS Y NATURALES DE ESPAÑA

*se complace en invitarle a la sesión científica pública*

## **Evolution and Future Trends in Process Systems Engineering: from Process/Product Design to Sustainable Systems and Supply Chains**

*impartida por el Académico Extranjero*

**Prof. Ignacio E. Grossmann**

Center for Advanced Process Decision-making - Carnegie Mellon University

*A la finalización del acto se hará entrega al Prof. Grossmann del diploma acreditativo de miembro de la Corporación.*

Martes, 16 de septiembre de 2025  
18.00 horas

Retransmisión en directo en  
 **YouTube**RAC

Calle Valverde, 22  
28004 Madrid

## Resumen de la conferencia

In this presentation we first give an overview how the area of Process Systems Engineering has evolved within the discipline of Chemical Engineering, as a multidisciplinary area whose science base relies on areas such as numerical analysis, mathematical optimization, systems and control theory, computer science and management science.

We show that while traditionally Process Systems Engineering has focused on the design of chemical processes, it has expanded its scope in three major directions. First, the move towards the molecular level has promoted developments in the areas of biomolecular engineering and product design. Second, the move towards the enterprise level has promoted developments in the areas of supply chain optimization and logistics. Finally, the move towards global climate change has promoted developments in the areas of sustainability, life-cycle analysis and energy transition towards renewable resources.

During the presentation we describe specific examples in each of these areas that include process intensification of complex distillation systems, biomass processing, protein and zeolite design, integrated process water networks, shale gas networks, power systems with high penetration of renewables, reverse electrodialysis, refineries decarbonization, digital supply chains, and resilient supply chains. A number of these projects have been the result of collaborations with industry in our Center for Advanced Process Decision-making and have shown to lead to significant improvements through systematic application of Process Systems Engineering techniques.