

1. Introduction

The 10th World Congress of Chemical Engineering (WCCE10) will be held in Barcelona in 2017, together with the 11th European Congress (ECCE11) and the 4th European Congress of Applied Biotechnology (ECAB4). The WCCE10 will be held in October 1st – 5th, 2017, at the same time as the Spanish industrial meeting Expoquimia, in the FIRA of Barcelona, Spain. The WCCE10 is organized under the auspices of the World Chemical Engineering Council (WCEC), the European Federation of Chemical Engineering (EFCE) and the European Society of Biochemical Engineering Sciences (ESBES). The congress is hosted by the EFCE-Spain Group, formed by four Spanish societies: ANQUE, AIQS, SEQUI and AEIC. All the information on the congress is available at the webpage: www.wcce10.com

The theme of the congress is Chemical & Biochemical Engineering in a Global World. The program is structured into two main branches:

- Chemical & Biochemical Engineering Core
- Grand Challenges for 21st Century

The Chemical & Biochemical Engineering Core will involve the following six main topics:

- Unit Operation & Separation Processes.
- Chemical Reaction Engineering.
- Process System Engineering.
- Materials and Product Engineering.
- Applied Biotechnology.
- Environmental & Sustainable Engineering.

The Grand Challenges are areas of priority for the 21st Century with a less theoretical focus than those cited in the Core or subjects that can be classified as inter- or multi- disciplinary.

- Energy.
- Water.
- Health & Wellness.
- Food & Nutrition.

In addition to the two above branches, there will be a number of major Symposia in areas such as Process Systems Engineering, Process Intensification, Sustainability Science and Engineering, Process Safety Symposium, and Applied Biotechnology. In the next few sections we give a brief overview of the program for the major topics, specialized symposia, and two special sessions on future trends in education and research. The schedule for the sessions and plenary talks is shown in Figure 1.

2. Major topics in WCCE

The WCCE will feature the following specific areas for each of the major topics:

TOPIC 1.- Knowledge, Education & Training

1.1.- Curriculum Development & Transformation

1.2.- e-Learning & e-Assessment

1-3-. Teaching Engineering Design Safety & Sustainability

TIME	SUNDAY 1st OCTOBER	MONDAY 2nd OCTOBER	TUESDAY 3rd OCTOBER	WEDNESDAY 4th OCTOBER	THURSDAY 5th OCTOBER
8:30 - 9:00		8:30 OPEN CEREMONY	8:30 ORAL SESSIONS	8:30 ORAL SESSIONS	8:30 ORAL SESSIONS
9:00 - 9:30		10:00 PLENARY	10:00 PLENARY	10:00 PLENARY	10:00 PLENARY
9:30 - 10:00		10:00 PLENARY	10:00 PLENARY	10:00 PLENARY	10:00 PLENARY
10:00 - 10:30		LECTURE 11:00	LECTURE 11:00	LECTURE 11:00	LECTURE 11:00
10:30 - 11:00		COFFE BREAK - POSTERS	COFFE BREAK - POSTERS	COFFE BREAK - POSTERS	COFFE BREAK - POSTERS
11:00 - 11:30		11:30 ORAL SESSIONS	11:30 ORAL SESSIONS	11:30 ORAL SESSIONS	11:30 ORAL SESSIONS
11:30 - 12:00		13:00	13:00	13:00	13:00
12:00 - 12:30		13:00	13:00	13:00	13:00
12:30 - 13:00		LUNCH	LUNCH	LUNCH	LUNCH
13:00 - 13:30		14:30	14:30	14:30	14:30
13:30 - 14:00		14:30 PLENARY	14:30 PLENARY	14:30 PLENARY	14:30 PLENARY
14:00 - 14:30		LECTURE 15:30	LECTURE 15:30	LECTURE 15:30	LECTURE 15:30
14:30 - 15:00		15:30	15:30	COFFE BREAK - POSTERS	COFFE BREAK - POSTERS
15:00 - 15:30		ORAL	ORAL	16:00	16:00
15:30 - 16:00		SESSIONS	SESSIONS	POSTER SESSION	CLOSURE CEREMONY
16:00 - 16:30		17:30	17:30	17:30	AWARDS
16:30 - 17:00	WELCOME	17:30 ORAL SESSIONS	17:30 ORAL SESSIONS		18:00
17:00 - 17:30	PLENARY				
17:30 - 18:00	LECTURE				
18:00 - 18:30					
18:30 - 19:00	COCKTAIL	19:00	19:00	GALA DINNER	

Fig. 1. Timetable of WCCE sessions

TOPIC 2.- Unit Operations & Separation Processes

- 2.1.- Thermodynamics & Transport Phenomena combined with JE-IUT
- 2.2.- Heat & Mass Transfer
- 2.3.- Separation Processes
- 2.4.- Particulate Solids integrated in PARMAT2017
- 2.5.- Mixing integrated in PARMAT2017

TOPIC 3.- Chemical Reaction Engineering

- 3.1.- Kinetics & Catalysis
- 3.2.- Chemical Reactors & Photochemical Reactors
- 3.3.- Electrochemical Processes & Reactors
- 3.4.- High Pressure Technology & Processes
- 3.5.- Multiphase Flow & Reactors combined with JE-Fibre Suspensions
- 3.6.- Micro-reactors

TOPIC 4.- Process Systems Engineering

- 4.1.- Computer Aided Process Engineering integrated in ESCAPE-27
- 4.2.- Industrial Process Safety
- 4.3.- Process Intensification integrated in IPIC1/EPIC6/APSPIS3

TOPIC 5.- Product Engineering & Advanced Materials

- 5.1.- Product Design (6th Symposium on Product Design and Engineering)
- 5.2.- New Materials & Nano-Materials
- 5.3.- Polymers & Composites
- 5.4.- Membrane Science & Technology
- 5.5.- Food Science & Technology

TOPIC 6.- Applied Biotechnology

- 6.1.- Bioprocess Engineering
- 6.2.- Health Biotechnology & Engineering
- 6.3.- Environmental Biotechnology
- 6.4.- Measuring, Modeling, Monitoring & Control
- 6.5.- Bio-based Economy: Biorefineries
- 6.6.- Marine Biotechnology & Engineering

TOPIC 7.- Environmental & Sustainable Chemical Engineering

- 7.1.- Resources Use & Sustainable Technologies partially integrated in ICCOSE 2017
- 7.2.- Air Pollution Control
- 7.3.- Water Management & Treatments combined with JE-AOP
- 7.4.- Waste Reduction & Valorization
- 7.5.- Soil Remediation & Hazardous Wastes
- 7.6.- Clean Energy Processes & New Energy Vectors
- 7.7.- Capture, Storage & Use of CO₂

The organization of some of these topics will be coordinated with a number of the specialized symposia listed in the next section.

3. Specialized Symposia

A unique feature of the World Congress in Barcelona is that it will feature a number of Specialized Symposia that will enrich both the content and participation to this meeting. The specialized symposia cover a broad range of areas as can be seen from the following list that includes links for detailed information:

27th European Symposium on Computer-Aided Process Engineering (ESCAPE-27)

<http://wcce10.org/index.php/jointevents/escape27>

Ignacio Grossmann, will be a plenary speaker as recipient of the Long Term Achievement Award of the European Federation of Chemical Engineering CAPE Working Party. The title of his talk is “Evolution of Process Systems Engineering and Future Trends in Research.”

International Process Intensification Conference (IPIC1/EPIC6/APSPIS3)

<http://wcce10.org/index.php/jointevents/ipic1-epic6-apspis3>

This conference is organized by an international committee, served by Prof. Phil Westmoreland (NCSU) and Dion Vlachos (Univ. of Delaware) from the US.

Evolution of Process Systems Engineering and International Congress on Sustainability Science and Engineering (ICOSSE'17) <http://wcce10.org/index.php/jointevents/icosse17>

International Conference on Processing, Handling and Characterization of Particulate Materials (PARMAT 2017) <http://wcce10.org/index.php/jointevents/parmat2017>

Advanced Oxidation Processes Symposium (AOPs) <http://wcce10.org/index.php/jointevents/aops-symposium>

CFD in Chemical Engineering: Process Design (JE-CFD)
<http://wcce10.org/index.php/jointevents/cfd-symposium>

4th Symposium On Industrial Use Of Thermodynamics (JE-IUT)
<http://wcce10.org/index.php/jointevents/industrial-use-thermodynamics>

2nd Workshop on Electrochemical Engineering: New Bridges for New Knowledge in Electrochemical Engineering (JE-ELECTROCHEMICAL ENGINEERING)
<http://wcce10.org/index.php/jointevents/electrochemical-engineering>

International Symposium on Lignocellulosic Materials - JE-IntSympLignCellMat 2017
<http://wcce10.org/index.php/jointevents/intsymplicellmat-2017>

Gas Hydrates and Applications <http://wcce10.org/index.php/jointevents/gas-hydrates>

7th International Symposium on Spouted Beds (JE-ISSB-7)
<http://wcce10.org/index.php/jointevents/issb-7>

Nanocelluloses: Engineered Applications and Sustainability (JE-NANOCELLULOSES)
<http://wcce10.org/index.php/jointevents/je-nanocelluloses>

Opportunity and Challenge for Energy Storage Engineering (JE-Energy Storage)
<http://wcce10.org/index.php/jointevents/je-energy-storage>

JE-Process Safety Symposium (2-3 October) <http://wcce10.org/index.php/jointevents/je-pss>

4. Special Sessions on Future Trends in Education and Research

In coordination with the Fellows Council of AIChE, the PI has organized together with Professors Engell from Technical University of Dortmund and Professor Arvind Varma two special sessions on future international trends in education and research, which will feature speakers from the U.S., Europe, Asia and Latin America. It is expected that these two sessions will serve as a basis of a special session at the AIChE meeting in Minneapolis in 2017. The details of the two sessions are the following:

Session 1: Trends and Challenges in Chemical Engineering Education

Chair: Sebastian Engell, Co-chair: Ignacio Grossmann *Tuesday, October 3, 15:30 to 17:30.*

This session will examine the evolution of chemical engineering education, and recent and future trends. An overview of the curriculum at each participating institution will be given indicating recent changes in light of new areas like biotechnology, nanotechnology, sustainability and energy. The importance of promoting innovation in the curriculum will be addressed to support the creation of new products and processes. Trends in student enrollments and hiring of new professors will be discussed, as well as breakdown of students pursuing industrial careers and postgraduate studies. Experts from the following countries will make brief presentations, and the session will conclude with a panel discussion.

Speakers:

United States - Ignacio Grossmann, Carnegie Mellon University

Germany - Norbert Kockmann, Technical University of Dortmund

Spain - Rafael van Grieken, Universidad Rey Juan Carlos, Madrid

United Kingdom - Marc Olivier Coppens, University College, London

Brazil - Ofelia de Queiroz F. Araujo, Universidad Federal Rio de Janeiro

China - Jinsong Zhao, Tsinghua University

Korea - Jae Woo Lee, Korean Advanced Institute of Science and Technology

Session 2: Trends and Challenges in Chemical Engineering Research

Chair: Arvind Varma, Co-chair: Ignacio Grossmann *Tuesday, October 3, 17:30 to 19:00.*

This session is motivated by the grand challenges that are being faced related to human health, energy, climate change and food supply. Based on their grounding in the natural sciences, particularly chemistry, mathematics, physics and increasingly also biology, chemical engineers are uniquely equipped to handle these challenges. This session will explore the current trends and challenges in chemical engineering research, particularly in the availability of funding sources for research support, which generates new technologies and prepares students for future R&D careers. Experts from the following countries will make brief presentations related to the subject. The session will conclude with a panel discussion involving the audience.

Speakers:

US – Arvind Varma, Purdue University

Europe – Guy Marin, Ghent University, Belgium

India – Devang Khakhar, IIT-Bombay

China – Wei-Kang Yuan and Xing-Gui Zhou, East China University of Science and Technology (ECUST)