



7th International Conference on Population Balance Modelling 2022

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Progress in Population Balance Modeling

Population balance modelling constitutes nowadays an established methodology in chemical engineering science, permitting to accurately describe several phenomena taking place in different fields, including pharmaceutical and chemical processing industry, medical applications, water treatment or biological systems. The international conference on population balance modeling was therefore held for the first time in 2001 in Kona (Hawaii) to respond to the increasing demand to meet and exchange about population balance fundamentals, new developments and solution techniques and applications, thus to overcome the boundaries between the different applications fields and enhance cross-disciplinary interactions as well as interactions between academia and industry. It became then a regular conference organized every three years in a different continent. It was so organized in 2004 in Valencia (Spain), in 2007 in Quebec (Canada), in 2010 in Berlin (Germany), in 2013 in Bangalore (India), in 2018 in Gent (Belgium), and the last edition was held in Lyon (France) in 2022. The organization and scientific committees of this conference are international and are changed from one edition to the other. With the four initial editions, a special issue was organized in Chemical Engineering Science ((Hounslow, 2002),(Nopens and Biggs, 2006), (Nopens et al., 2009), (Kumar and Briesen, 2012)) and the edition of 2018 was followed by a special issue in Processes (Mansouri et al., 2021).

The present special issue contains papers presented in the 7th International conference on PBM (2022) in Lyon. The papers were selected after a thorough reviewing process. In this conference (where 64 abstracts were submitted), the domains of applications were quite wide, including for instance crystallization and precipitation, liquid-liquid and gas-liquid systems, polymerization and granulation. Almost half of the contributions were related to the challenges of PBM in practical or novel applications (including the measurements, adaptation of the kernels and numerical implementation), one third concerned multiscale coupling of PBM (mainly with Computational Fluid Dynamics, and few with Discrete Element Method), and a complete session concerned solution methods of PBM. It appears that it is essential to correctly couple the PBM with the hydrodynamics, reaction or mass transfer to ensure good capturing and identification of the physics of the problem.

Each day of the conference was launched by a keynote of an expert in the field of PBM. Dr. R. Bertrum Diemer (University of Delaware, USA) presented an example of industrial implementations of PBM and resolution methods, based on his long carrier in the DuPont Company. Professor Rodney O. Fox (Iowa State University, USA) analyzed the latest advances in the quadrature-based moment methods during the last twenty years. Professor Achim Kienle (Max Planck Institute and Otto von Guericke, University of Magdeburg, Germany) presented an application of PBM for the control of particle formation in fluidized beds.

Following this conference, a yearly PhD webinar on PBM was launched. It will allow for more regular interactions between PhD students and researchers in the domain of PBM. It is going to be organized by PhD students and the presentations are given by PhD students, except for the keynotes. The first edition is planned for 30 November 2023. The 8th PBM international conference is planned for 2025 and will be held at Purdue University (Lafayette, USA).

This special issue is composed of ten research articles related to the different conference themes. The organizing committee expresses its gratitude to the contributing authors and to the Editorial Office team at ChERD for assistance all along the reviewing and publishing process.

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