



# Multiphase Flow Analysis Using Population Balance Modeling: Bubbles, Drops and Particles

By Guan Heng Yeoh Ph.D. Mechanical Engineering (CFD) University of New South Wales Sydney, Dr. Chi Pok Cheung, Jiyuan Tu Ph.D. in Fluid Mechanics Royal Institute of Technology Stockholm Sweden

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Written by leading multiphase flow and CFD experts, this book enables engineers and researchers to understand the use of PBM and CFD frameworks. Population balance approaches can now be used in conjunction with CFD, effectively driving more efficient and effective multiphase flow processes. Engineers familiar with standard CFD software, including ANSYS-CFX and ANSYS-Fluent, will be able to use the tools and approaches presented in this book in the effective research, modeling and control of multiphase flow problems.

- Builds a complete understanding of the theory behind the application of population balance models and an appreciation of the scale-up of computational fluid dynamics (CFD) and population balance modeling (PBM) to a variety of engineering and industry applications in chemical, pharmaceutical, energy and petrochemical sectors
- The tools in this book provide the opportunity to incorporate more accurate models in the design of chemical and particulate based multiphase processes
- Enables readers to translate theory to practical use with CFD software

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## **Bibliography**

- Sales Rank: #3377844 in Books
- Published on: 2013-11-06
- Original language: English
- Number of items: 1
- Dimensions: 9.30" h x 1.00" w x 7.60" l, 2.15 pounds
- Binding: Hardcover
- 384 pages



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### **About the Author**

Guan Heng Yeoh is an Associate Professor at the School of Mechanical and Manufacturing Engineering, UNSW, and a Senior Research Scientist at ANSTO. He is the founder and Editor of the Journal of Computational Multiphase Flows and the Group Leader of Computational Thermal-Hydraulics of OPAL Research Reactor, ANSTO. He has approximately 180 publications including 7 books, 10 book chapters, 83 journal articles, and 80 conference papers with an H-index 16 and over 800 citations. His research interests are computational fluid dynamics (CFD); numerical heat and mass transfer; turbulence modelling using Reynolds averaging and large eddy simulation; combustion, radiation heat transfer, soot formation and oxidation, and solid pyrolysis in fire engineering; fundamental studies in multiphase flows: free surface, gas-particle, liquid-solid (blood flow and nanoparticles), and gas-liquid (bubbly, slug/cap, churn-turbulent, and subcooled nucleate boiling flows); computational modelling of industrial systems of single-phase and multiphase flows.

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