

1. Record Nr.	UNINA9910438120103321
Autore	Tu Jiyuan
Titolo	Computational fluid particle dynamics in the human respiratory system // Jiyuan Tu, Kiao Inthavong, Goodarz Ahmadi
Pubbl/distr/stampa	New York, : Springer, 2013
ISBN	1-283-63376-0 9786613946218 94-007-4488-9
Edizione	[1st ed. 2013.]
Descrizione fisica	1 online resource (382 p.)
Collana	Biological and medical physics, biomedical engineering, , 1618-7210
Altri autori (Persone)	InthavongKiao AhmadiGoodarz
Disciplina	612.2/01/13
Soggetti	Biological transport Respiratory organs Fluid dynamics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	From the Contents: Computational Fluid Particle Dynamics (CFPD) – An Introduction: What is CFPD -- The Human Respiratory System: Introduction -- Anatomy of the respiratory system -- Reconstruction of the Human Airways: Introduction -- Medical image acquisition -- Generation of Computational Mesh for CFPD Simulation: Introduction -- Mesh types -- Fundamentals of Fluid Dynamics: Introduction -- Fluid dynamics and governing equations -- Fundamentals of Particle Dynamics: Particle dynamics and mathematical models -- Particle trajectory models -- Continuum approach -- Modelling of further particle physics -- Basic Computational Methods: Introduction -- Case studies in the human airways: Introduction -- Modelling inhalation and heat transfer in the nasal cavity -- Inhalation of toxic particles and the effects of particle morphology -- Optimisation of nasal drug delivery -- Advanced Topics and Future Trends: Moving and Deforming Mesh -- Fluid-Structure Interaction.
Sommario/riassunto	Traditional research methodologies in the human respiratory system have always been challenging due to their invasive nature. Recent advances in medical imaging and computational fluid dynamics (CFD)

have accelerated this research. This book compiles and details recent advances in the modelling of the respiratory system for researchers, engineers, scientists, and health practitioners. It breaks down the complexities of this field and provides both students and scientists with an introduction and starting point to the physiology of the respiratory system, fluid dynamics and advanced CFD modeling tools. In addition to a brief introduction to the physics of the respiratory system and an overview of computational methods, the book contains best-practice guidelines for establishing high-quality computational models and simulations. Inspiration for new simulations can be gained through innovative case studies as well as hands-on practice using pre-made computational code. Last but not least, students and researchers are presented the latest biomedical research activities, and the computational visualizations will enhance their understanding of physiological functions of the respiratory system.

---