1.	Record Nr.	UNISA996511862403316
	Autore	Zohdi Tarek I.
	Titolo	Modeling and simulation of infectious diseases : microscale transmission, decontamination and macroscale propagation / / Tarek I. Zohdi
	Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
	ISBN	3-031-18053-4
	Edizione	[1st ed. 2022.]
	Descrizione fisica	1 online resource (123 pages)
	Disciplina	616.9
	Soggetti	Communicable diseases - Mathematical models COVID-19 Pandemic, 2020- Malalties infeccioses Pandèmia de COVID-19, 2020- Models matemàtics Llibres electrònics
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di contenuto	Preliminaries: Basic Mathematics, Optimization and Machine-Learning -- Macroscale Disease Propagation -- Microscale Disease Transmission and Ventilation System Design -- Ultraviolet Viral Decontamination -- Vaccine Design and Immune-System Response -- Epilogue.
	Sommario/riassunto	The COVID-19 pandemic that started in 2019-2020 has led to a gigantic increase in modeling and simulation of infectious diseases. There are numerous topics associated with this epoch-changing event, such as (a) disease propagation, (b) transmission, (c) decontamination, and (d) vaccines. This is an evolving field. The targeted objective of this book is to expose researchers to key topics in this area, in a very concise manner. The topics selected for discussion have evolved with the progression of the pandemic. Beyond the introductory chapter on basic mathematics, optimization, and machine learning, the book covers four themes in modeling and simulation infectious diseases, specifically: Part 1: Macroscale disease propagation, Part 2: Microscale disease transmission and ventilation system design, Part 3: Ultraviolet

viral decontamination, and Part 4: Vaccine design and immune response. It is important to emphasize that the rapid speed at which the simulations operate makes the presented computational tools easily deployable as digital twins, i.e., digital replicas of complex systems that can be inexpensively and safely optimized in a virtual setting and then used in the physical world afterward, thus reducing the costs of experiments and also accelerating development of new technologies.