

1. Record Nr.	UNINA9910300430103321
Titolo	Complex Fluids in Biological Systems : Experiment, Theory, and Computation // edited by Saverio E. Spagnolie
Pubbl/distr/stampa	New York, NY : , : Springer New York : , : Imprint : Springer, , 2015
ISBN	1-4939-2065-0
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (449 p.)
Collana	Biological and Medical Physics, Biomedical Engineering, , 1618-7210
Disciplina	530 530.41 570.285 571.4 571.6 620.1064
Soggetti	Biophysics Biological physics Fluid mechanics Cell physiology Amorphous substances Complex fluids Biomathematics Biological and Medical Physics, Biophysics Engineering Fluid Dynamics Cell Physiology Soft and Granular Matter, Complex Fluids and Microfluidics Mathematical and Computational Biology
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	Part I: Introduction to Complex Fluids -- Introduction to complex fluids -- Complex fluids and soft structures in the human body -- Part II: Rheology of Complex Biological Fluids -- Theoretical microrheology -- Membrane rheology -- Rheology and mechanics of the cell cytoskeleton -- Experimental challenges of shear rheology: how to

avoid bad data.-Part III: Locomotion and Active Matter -- Locomotion through complex fluids: an experimental view -- Theory of locomotion through complex fluids -- Theory of active suspensions -- Part IV: Computational Methods -- Computational challenges for simulating strongly elastic flows in biology -- Cell distribution and segregation phenomena during blood flow.

Sommario/riassunto

This book serves as an introduction to the continuum mechanics and mathematical modeling of complex fluids in living systems. The form and function of living systems are intimately tied to the nature of surrounding fluid environments, which commonly exhibit nonlinear and history dependent responses to forces and displacements. With ever-increasing capabilities in the visualization and manipulation of biological systems, research on the fundamental phenomena, models, measurements, and analysis of complex fluids has taken a number of exciting directions. In this book, many of the world's foremost experts explore key topics such as: Macro- and micro-rheological techniques for measuring the material properties of complex biofluids and the subtleties of data interpretation Experimental observations and rheology of complex biological materials, including mucus, cell membranes, the cytoskeleton, and blood The motility of microorganisms in complex fluids and the dynamics of active suspensions Challenges and solutions in the numerical simulation of biologically relevant complex fluid flows This volume will be accessible to advanced undergraduate and beginning graduate students in engineering, mathematics, biology, and the physical sciences, but will appeal to anyone interested in the intricate and beautiful nature of complex fluids in the context of living systems.
