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Titolo	Flow Control Through Bio-inspired Leading-Edge Tubercles [[electronic resource] ] : Morphology, Aerodynamics, Hydrodynamics and Applications / / edited by Daniel T. H. New, Bing Feng Ng
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ISBN	3-030-23792-3
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XIII, 178 p.)
Disciplina	532.0595
Soggetti	Fluids Fluid mechanics Aerospace engineering Astronautics Animal anatomy Engineering design Fluid- and Aerodynamics Engineering Fluid Dynamics Aerospace Technology and Astronautics Animal Anatomy / Morphology / Histology Engineering Design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Opportunities from Nature -- Perspectives and Applications -- Experimental Aerodynamics -- Geometry Optimization -- Flow Control on Hydrofoils -- Spanwise Flow -- Noise Attenuation -- Dynamic Effects -- Aeroelasticity.
Sommario/riassunto	This book describes and explains the basis of bio-inspired, leading-edge tubercles based on humpback whale flippers as passive but effective flow control devices, as well as providing a comprehensive practical guide in their applications. It first discusses the morphology of the humpback whale flipper from a biological perspective, before presenting detailed experimental and numerical findings from past

investigations by various experts on the benefits of leading-edge tubercles and their engineering implementations. Leading-edge tubercle designs and functions have attracted considerable interest from researchers in terms of understanding their role in the underwater agility of these whales, and to exploit their flow dynamics in the development of new and novel engineering solutions. Extensive research over the past recent years has demonstrated that the maneuverability of these whales is at least in part due to the leading-edge tubercles acting as passive flow control devices to delay stall and increase lift in the post-stall regime. In addition to the inherent benefits in terms of aerodynamics and hydrodynamics, investigations into leading-edge tubercles have also broadened into areas of noise attenuation, stability and industrial applications. This book touches upon these areas, with an emphasis upon the effects of lifting-surface types, flow regimes, tubercle geometries, lifting-surface stability and potential industrial applications, among others. As such, it features contributions from key experts in the fields of biology, physics and engineering who have conducted significant studies into understanding the various aspects of leading-edge tubercles. Given the broad coverage and in-depth analysis, this book will benefit academic researchers, practicing engineers and graduate students interested in tapping into such a unique but highly functional flow control strategy.

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