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Nota di contenuto	Preface -- 1: Protistan Skeletons: A Geologic History of Evolution and Constraint -- 2: Morphospaces and Databases: Diatom Diversification through Time -- 3: Biomineralization in Diatoms: The Organic Templates -- 4: Mandibular Gnathobases of Marine Planktonic Copepods – Structural and Mechanical Challenges for Diatom Frustules -- 5: Diatom Frustule Morphology and its Biomimetic Applications in Architecture and Industrial Design -- 6: Fiber Reinforced Building Envelopes Inspired by Nature: Pavilion COCOON_FS -- 7: Biomimetic Engineering of Tailored, Ultra-Lightweight Fibrous Composites -- 8: Echinoderms: Hierarchically Organized Light Weight Skeletons -- 9: Research Review: The Functions of Phytoliths in Land Plants -- 10: ELiSE – An Integrated, Holistic, Bionic Approach to Develop Optimized

Lightweight Solutions For Engineering, Architecture, and Design -- 11: Offshore Foundation Based on the ELiSE Method.

Sommario/riassunto

This volume contains studies on the evolution and function of lightweight constructions of planktonic and other organisms, and examples of how they can be used to create new solutions for radical innovations of lightweight constructions for technological application. The principles and underlying processes responsible for evolution and biodiversity of marine plankton organisms are highly relevant and largely unresolved issues in the field of marine science. Amongst the most promising objects for the study of evolution of stable lightweight constructions are marine organisms such as diatoms or radiolarians. Research in these fields requires interdisciplinary expertises such as in evolutionary modelling, paleontology, lightweight optimization, functional morphology, and marine ecology. Considerable effort and expert knowledge in production engineering or lightweight optimization is necessary to transfer knowledge on biogenic structures and evolutionary principles into new lightweight solutions. This book show methods and examples of how this can be achieved efficiently.