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Sommario/riassunto

THE MATHEMATICAL BIOLOGY OF DIATOMS This book contains unique, advanced applications using mathematics, algorithmic techniques, geometric analysis, and other computational methods in diatom research. Historically, diatom research has centered on taxonomy and systematics. While these topics are of the utmost importance, other aspects of this important group of unicells have been increasingly explored in the biological sciences. While mathematical applications are still rare, they are starting take hold and provide an extensive avenue of new diatom research, including applications in multidisciplinary fields. The work contained in this volume is an eclectic mix of analytical studies on diatoms. Mathematical treatment of the various biological disciplines covered in this book range from implicit, but succinct studies to more elaborate detailed computational studies. Topics include growth models, nanostructure, nanoengineering, cell growth, araphid diatoms, valve ontogeny, diatom metabolism, diatom motility, synchronization, diatom kinematics, photonics, biogenic sensors, photochemistry, diatom light response, colony growth, siliceous unicells, algal kinetics, diatom structure, diatom imaging, functional morphology, geometric structure, biomineralization, high-resolution imaging, non-destructive imaging, and 3D structure. This wide-ranging volume provides an introductory as well as an advanced treatment of recent interests in diatom research. The mathematical research in this volume may be applicable to studies of other unicells, biomechanics, biological processes, physio-chemical analyses, or nanoscience.
