



Fundamentals of Biofilm Research

Zbigniew Lewandowski, Haluk Beyenal

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The history of natural sciences demonstrates that major advances in the understanding of natural processes follow the development of relevant tools. The progress of biofilm research is no different. While individual areas have mushroomed in recent years, difficulties in reproducing results, communicating new findings, and reconciling differences in conceptual versus mathematical advances are holding back the true growth of the field.

Fundamentals of Biofilm Research offers a system of compatible tools and measurements that can be used to conduct biofilm studies and consistently interpret their results. After extensive testing and refinement in labs and classrooms over twenty years, the authors introduce a coherent system of conceptual, physical, computational, and virtual tools to help achieve reproducible results, align research specific parameters, ease difficulties in communication among disparate arenas, and implement consistent and reproducible procedures to interpret meaningful results. The authors reconcile the inability of computational methods to account for conceptual variables with the use of the stratified biofilm model. In this way researchers can combine the results of various measurements conducted within the space occupied by the biofilm. In addition to the wealth of information provided in the book, the authors also provide a CD with several software packages including extracting numerical parameters, computing nutrient concentration, calculating biokinetic parameters, controlling micropositioners, and measuring chemical concentration using microelectrodes.

Emphasizing process analysis, engineering systems, biofilm applications, and mathematical modeling, **Fundamentals of Biofilm Research** provides the tools to synergize and unify research and advance biofilm research as a whole.

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