



# Environmental Biotechnology: A Biosystems Approach

*By Daniel A. Vallero*

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## **Environmental Biotechnology: A Biosystems Approach** By Daniel A. Vallero

Environmental Biotechnology: A Biosystems Approach introduces a systems approach to environmental biotechnology and its applications to a range of environmental problems. A systems approach requires a basic understanding of four disciplines: environmental engineering, systems biology, environmental microbiology, and ecology. These disciplines are discussed in the context of their application to achieve specific environmental outcomes and to avoid problems in such applications.

The book begins with a discussion of the background and historical context of contemporary issues in biotechnology. It then explains the scientific principles of environmental biotechnologies; environmental biochemodynamic processes; environmental risk assessment; and the reduction and management of biotechnological risks. It describes ways to address environmental problems caused or exacerbated by biotechnologies. It also emphasizes need for professionalism in environmental biotechnological enterprises.

This book was designed to serve as a primary text for two full semesters of undergraduate study (e.g., Introduction to Environmental Biotechnology or Advanced Environmental Biotechnology). It will also be a resource text for a graduate-level seminar in environmental biotechnology (e.g., Environmental Implications of Biotechnology).

- \* Provides a systems approach to biotechnologies which includes the physical, biological, and chemical processes in context
- \* Case studies include cutting-edge technologies such as nanobiotechnologies and green engineering
- \* Addresses both the applications and implications of biotechnologies by following the life-cycle of a variety of established and developing biotechnologies

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## **Editorial Review**

### **About the Author**

Dr. Daniel A. Vallero is an internationally recognized expert in environmental science and engineering. His four decades of research, teaching and professional experience in hazardous waste engineering and management have addressed a wide range of human health risk and ecological issues, from global climate change to the release of hazardous wastes. His research has advanced the state-of-the-science of air and water pollution measurement, models of potential exposures to chemicals in consumer products, and environmental impact assessments.

He established the Engineering Ethics program and is a key collaborator in the Responsible Conduct of Research Program at Duke University. These programs introduce students, from first-year through PhD, to the complex relationships between science, technology and societal demands on the engineer. The lessons learned from the cases in this book are a fundamental part of Duke's preparation of its future engineers to address the ethical dilemmas likely to be encountered during the careers of the next generation engineers.

Dr. Vallero received a bachelor's degree from Southern Illinois University, a Master of Science in City & Regional Planning from SIU, a Masters in Civil & Environmental Engineering (Environmental Health Sciences) from the University of Kansas, and a PhD in Civil & Environmental Engineering from Duke.

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