

1. Record Nr.	UNINA9910970684603321
Autore	Lee W. David <1946->
Titolo	From X-rays to DNA : how engineering drives biology / / David W. Lee, with Jeffrey Drazen, Phillip A. Sharp, and Robert S. Langer
Pubbl/distr/stampa	2013 Cambridge, Massachusetts : , : The MIT Press, , [2014] ©2014
ISBN	0-262-31839-3 0-262-31838-5
Edizione	[1st ed.]
Descrizione fisica	1 online resource (247 p.)
Classificazione	SCI008000TEC056000
Disciplina	610.28
Soggetti	Biomedical engineering Medicine - Research - History Medical instruments and apparatus - Technological innovations Surgical instruments and apparatus - Technological innovations
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Contents; Preface; Acknowledgments; I Introduction ; 1 An Opportunity for Greater Discovery; 2 Concurrent Engineering and Science; 3 Engineering and the Engineer; II From Peas to Genome: Engineering-Enabled Biological Research; 4 Discovery of Chromosomes and the Submicrometer Microscope; 5 DNA: Gels, Paper, and Columns; 6 Structure of DNA and Proteins: X-ray Diffraction; 7 Observing DNA and Protein in Action: Radioisotope Labels; 8 Transcription and Electron Microscopy; 9 Protein and DNA Automated Sequencing; III Concurrent Engineering and Biology 10 Concurrent versus Nonconcurrent Engineering 11 The Engineers and Scientists of Concurrent Engineering; 12 Institutions and Teams for Concurrent Biology and Engineering; 13 Concurrent Engineering in the Clinic; 14 Unmet Needs: Mapping and Understanding Cell Signaling; 15 Unmet Needs: Cancer Example; 16 Summing Up; Notes; References; Index
Sommario/riassunto	"Engineering has been an essential collaborator in biological research and breakthroughs in biology are often enabled by technological

advances. Decoding the double helix structure of DNA, for example, only became possible after significant advances in such technologies as X-ray diffraction and gel electrophoresis. Diagnosis and treatment of tuberculosis improved as new technologies -- including the stethoscope, the microscope, and the X-ray -- developed. These engineering breakthroughs take place away from the biology lab, and many years may elapse before the technology becomes available to biologists. In this book, David Lee argues for concurrent engineering -- the convergence of engineering and biological research -- as a means to accelerate the pace of biological discovery and its application to diagnosis and treatment. He presents extensive case studies and introduces a metric to measure the time between technological development and biological discovery. Investigating a series of major biological discoveries that range from pasteurization to electron microscopy, Lee finds that it took an average of forty years for the necessary technology to become available for laboratory use. Lee calls for new approaches to research and funding to encourage a tighter, more collaborative coupling of engineering and biology. Only then, he argues, will we see the rapid advances in the life sciences that are critically needed for life-saving diagnosis and treatment."
