

1. Record Nr.	UNINA9910814230903321
Autore	Auyang Sunny Y
Titolo	Engineering : an endless frontier // Sunny Y. Auyang
Pubbl/distr/stampa	Cambridge, MA, : Harvard University Press, 2004
ISBN	0-674-02032-4
Edizione	[1st ed.]
Descrizione fisica	viii, 344 p. : ill
Disciplina	620
Soggetti	Engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references (p. [310]-335) and index.
Nota di contenuto	Frontmatter -- CONTENTS -- Preface -- 1. INTRODUCTION -- 2. TECHNOLOGY TAKES OFF -- 3. ENGINEERING FOR INFORMATION -- 4. ENGINEERS IN SOCIETY -- 5. INNOVATION BY DESIGN -- 6. SCIENCES OF USEFUL SYSTEMS -- 7. LEADERS WHO ARE ENGINEERS -- Appendix A. Statistical Profiles of Engineers -- Appendix B. U.S. Research and Development -- Notes -- Index
Sommario/riassunto	Genetic engineering, nanotechnology, astrophysics, particle physics: We live in an engineered world, one where the distinctions between science and engineering, technology and research, are fast disappearing. This book shows how, at the dawn of the twenty-first century, the goals of natural scientists--to discover what was not known--and that of engineers--to create what did not exist--are undergoing an unprecedented convergence. Sunny Y. Auyang ranges widely in demonstrating that engineering today is not only a collaborator with science but its equal. In concise accounts of the emergence of industrial laboratories and chemical and electrical engineering, and in whirlwind histories of the machine tools and automobile industries and the rise of nuclear energy and information technology, her book presents a broad picture of modern engineering: its history, structure, technological achievements, and social responsibilities; its relation to natural science, business administration, and public policies. Auyang uses case studies such as the development of the F-117A Nighthawk and Boeing 777 aircraft, as well as the experiences of engineer-scientists such as Oliver Heaviside, engineer-entrepreneurs such as Henry Ford and Bill Gates, and engineer-managers such as Alfred Sloan

and Jack Welch to give readers a clear sense of engineering's essential role in the future of scientific research. Table of Contents: Preface 1. Introduction 2 . Technology Takes Off 2.1 From Practical Art to Technology 2.2 Construction Becomes Mathematical 2.3 Experimenting with Machines 2.4 Science and Chemical Industries 2.5 Power and Communication 3. Engineering for Information 3.1 From Microelectronics to Nanotechnology 3.2 Computer Hardware and Software 3.3 Wireless, Satellites, and the Internet 4. Engineering in Society 4.1 Social Ascent and Images of Engineers 4.2 Partnership in Research and Development 4.3 Contributions to Sectors of the Economy 5. Innovation by Design 5.1 Inventive Thinking in Negative Feedback 5.2 Design Processes in Systems Engineering 5.3 "Working Together" in Aircraft Development 5.4 From Onboard Computers to Door Hinges 6. Sciences of Useful Systems 6.1 Mathematics in Engineering and Science 6.2 Information and Control Theories 6.3 Wind Tunnels and Internet Simulation 6.4 Integrative Materials Engineering 6.5 Biological Engineering Frontiers 7. Leaders Who Are Engineers 7.1 Business Leaders in the Car Industry 7.2 Public Policies and Nuclear Power 7.3 Managing Technological Risks Appendix A. Statistical Profiles of Engineers Appendix B. U.S. Research and Development Notes Index I am impressed by the scope of Engineering - An Endless Frontier, and fascinated by Sunny Auyang's comprehensive knowledge of the subject. This is just the kind of book the National Academy of Engineering has been encouraging to promote the importance of engineering to the public. It will have a long shelf-life in that it pulls together material that is not readily accessible, and will serve as a reference for anyone interested in engineering as a profession. Engineering needs this book!--John Hutchinson, Harvard University Engineering - An Endless Frontier is extraordinary in scope. Sunny Auyang describes the different kinds of contemporary engineering practices and productions, attempts to provide historical background, explains the scientific basis for engineering innovation in different fields, and addresses the broad, systems level managerial, entrepreneurial, and design activities of professionals. It's rare to find a single author who can grasp and explain the essential features of modern technologies across such an array of industrial sectors and engineering disciplines and explain how they work, why they work they way they do, and what is required for their innovation, development and, yes, even maintenance.--Louis L. Bucciarelli, Professor Emeritus of Engineering and Technology Studies, MIT
