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This is the first coherent book on literature-based discovery (LBD). LBD is an inherently multi-disciplinary enterprise. The aim of this volume is to plant a flag in the ground and inspire new researchers to the LBD challenge. During the last decade, national and international scientific organizations have become increasingly engaged in considering how to respond to the biosecurity implications of developments in the life sciences and in assessing trends in science and technology (S&T) relevant to biological and chemical weapons nonproliferation. The latest example is an international workshop, Trends in Science and Technology Relevant to the Biological Weapons Convention, held October 31 - November 3, 2010 at the Institute of Biophysics of the Chinese Academy of Sciences in Beijing. Life Sciences and Related Fields summarizes the workshop, plenary, and breakout discussion sessions held during this convention. Given the immense diversity of current research and development, the report is only able to provide an overview of the areas of science and technology the committee believes are potentially relevant to the future of the Biological and Toxic Weapons Convention (BWC), although there is an effort to identify areas that seemed particularly ripe for further exploration and analysis. The report offers findings and conclusions organized around three fundamental and frequently cited trends in S&T that affect the scope and operation of the convention: The rapid pace of change in the life sciences and related fields; The increasing diffusion of life sciences research capacity and its applications, both internationally and beyond traditional research institutions; and The extent to which additional scientific and technical disciplines beyond biology are increasingly involved in life sciences research. The report does not make recommendations about policy options to respond to the implications of the identified trends. The choice of such responses rests with the 164 States Parties to the Convention, who must take into account multiple factors beyond the project's focus on the state of the science. Deep learning has already achieved remarkable results in many fields. Now it's making waves throughout the sciences broadly and the life sciences in particular. This practical book teaches developers and scientists how to use deep learning for genomics, chemistry, biophysics, microscopy, medical analysis, and other fields. Ideal for practicing developers and scientists ready to apply their skills to scientific applications such as biology, genetics, and drug discovery, this book introduces several deep network primitives. You'll follow a case study on the problem of designing new therapeutics that ties together physics, chemistry, biology, and medicine—an example that represents one of science's greatest challenges. Learn the basics of performing machine learning on molecular data Understand why deep learning is a powerful tool for genetics and genomics Apply deep learning to understand biophysical systems Get a brief introduction to machine learning with DeepChem Use deep learning to analyze microscopic images Analyze medical scans using deep learning techniques Learn about variational autoencoders and generative adversarial networks Interpret what your model is doing and how it's working The Nobel Prizes in natural sciences have achieved the reputation of being the ultimate accolade for scientific achievements. This book gives a unique insight into the selection of Nobel Prize recipients, in particular the life sciences. The evolving mechanisms of selection of prize recipients are illustrated by reference to archives, which have remained secret for 1) years. Many of the prizes subjected to particular evaluation concern awards given for discoveries in the field of infectious diseases and the interconnected field of genetics. The book illustrates the individuals and environments that are

conducive to scientific creativity. Nowhere is this enigmatic activity'-- the mime mover in advancing the human condition highlighted as lucidly as by identification individuals worthy of Nobel Prizes. --Book Jacket. Fluorescence Microscopy is a precise and widely employed technique in many research and clinical areas nowadays. Fluorescence Microscopy In Life Sciences introduces readers to both the fundamentals and the applications of fluorescence microscopy in the biomedical field as well as biological research. Readers will learn about physical and chemical mechanisms giving rise to the phenomenon of luminescence and fluorescence in a comprehensive way. Also, the different processes that modulate fluorescence efficiency and fluorescence features are explored and explained. Does nature have intrinsic value? Should we be doing more to save wilderness and ocean ecosystems? What are our duties to future generations of humans? Do animals have rights? This revised edition of "Life Science Ethics" introduces these questions using narrative case studies on genetically modified foods, use of animals in research, nanotechnology, and global climate change, and then explores them in detail using essays written by nationally-recognized experts in the ethics field. Part I introduces ethics, the relationship of religion to ethics, how we assess ethical arguments, and a method ethicists use to reason about ethical theories. Part II demonstrates the relevance of ethical reasoning to the environment, land, farms, food, biotechnology, genetically modified foods, animals in agriculture and research, climate change, and nanotechnology. Part III presents case studies for the topics found in Part II. Valuation is a hot topic among life sciences professionals. There is no clear understanding on how to use the different valuation approaches and how to determine input parameters. Some do not value at all, arguing that it is not possible to get realistic and objective numbers out of it. Some claim it to be an art. In the following chapters we will provide the user with a concise valuation manual, providing transparency and practical insight for all dealing with valuation in life sciences: project and portfolio managers, licensing executives, business developers, technology transfer managers, entrepreneurs, investors, and analysts. The purpose of the book is to explain how to apply discounted cash flow and real options valuation to life sciences projects, i.e. to license contracts, patents, and firms. We explain the fundamentals and the pitfalls with case studies so that the reader is capable of performing the valuations on his own and repeat the theory in the exercises and case studies. The book is structured in five parts: In the first part, the introduction, we discuss the role of the players in the life sciences industry and their particular interests. We describe why valuation is important to them, where they need it, and the current problems to it. The second part deals with the input parameters required for valuation in life sciences, i.e. success rates, costs, peak sales, and timelines. A clear and concise survey of the major themes and theories embedded in the history of life science, this book covers the development and significance of scientific methodologies, the relationship between science and society, and the diverse ideologies and current paradigms affecting the evolution and progression of biological studies. The author discusses cell theory, embryology, physiology, microbiology, evolution, genetics, and molecular biology; the Human Genome Project; and genomics and proteomics. Covering the philosophies of ancient civilizations to modern advances in genomics and molecular biology, the book is a unique and comprehensive resource. 'The processes of internationalization, innovation and venture-creation in high-technology new ventures are inextricably intertwined. This is particularly true in the uncertain and troubled waters of the life sciences industry where startups with very uncertain futures are required to face significant challenges in short windows of opportunity. Navigating these waters is not straightforward, either for those immediately involved in it, or for those trying to understand it. This book is a must-read for anyone who is serious about understanding entrepreneurship in the biotechnology industry.' Alberto Onetti, CrESIT (Research Center for Innovation and Life Science Management), Italy In this thought-provoking book, leading experts explore why international entrepreneurship is important to the life sciences industry. From multi-disciplinary and cross-national perspectives, they question why international entrepreneurship scholars might usefully invest interest in research focused on one specific industry context. The book addresses contemporary challenges of relevance to life science firms and draws on leading-edge debates in international entrepreneurship research. Topics include: the nature of the born-global firm; the development of international capabilities and competencies; the role of local and international partnerships and alliances; competitiveness, opportunity recognition and orientation; and the

role of specialized complementary assets in internationalization. It concludes by proposing an agenda for future research across the underpinning fields of innovation, entrepreneurship and internationalization. This book will prove a stimulating read for academics, students and researchers with an interest in international business, management and entrepreneurship, as well as for practitioners in the health professions or life sciences academics who are, or may become, entrepreneurs. This book covers several of the statistical concepts and data analytic skills needed to succeed in data-driven life science research. The authors proceed from relatively basic concepts related to computed p-values to advanced topics related to analyzing highthroughput data. They include the R code that performs this analysis and connect the lines of code to the statistical and mathematical concepts explained. Broad perspective on collectivity in the life sciences, from microorganisms to human consensus, and the theoretical and empirical opportunities and challenges. Many researchers and scholars in the life sciences have become increasingly critical of the traditional methodological focus on the individual. This volume counters such methodological individualism by exploring recent and influential work in the life sciences that utilizes notions of collectivity, sociality, rich interactions, and emergent phenomena as essential explanatory tools to handle numerous persistent scientific questions in the life sciences. The contributors consider case studies of collectivity that range from microorganisms to human consensus, discussing theoretical and empirical challenges and the innovative methods and solutions scientists have devised. The contributors offer historical, philosophical, and biological perspectives on collectivity, and describe collective phenomena seen in insects, the immune system, communication, and human collectivity, with examples ranging from cooperative transport in the longhorn crazy ant to the evolution of autobiographical memory. They examine ways of explaining collectivity, including case studies and modeling approaches, and explore collectivity's explanatory power. They present a comprehensive look at a specific case of collectivity: the Holobiont notion (the idea of a multi-species collective, a host and diverse microorganisms) and the hologenome theory (which posits that the holobiont and its hologenome are a unit of adaptation). The volume concludes with reflections on the work of the late physicist Eshel Ben-Jacob, pioneer in the study of collective phenomena in living systems. Contributors Oren Bader, John Beatty, Dinah R. Davison, Daniel Dor, Ofer Feinerman, Raghavendra Gadagkar, Scott F. Gilbert, Snait B. Gissis, Deborah M. Gordon, James Griesemer, Zachariah I. Grochau-Wright, Erik R. Hanschen, Eva Jablonka, Mohit Kumar Jolly, Anat Kolumbus, Ehud Lamm, Herbert Levine, Arnon Levy, Xue-Fei Li, Elisabeth A. Lloyd, Yael Lubin, Eva Maria Luef, Ehud Meron, Richard E. Michod, Samir Okasha, Simone Pika, Joan Roughgarden, Eugene Rosenberg, Ayelet Shavit, Yael Silver, Alfred I. Tauber, Ilana Zilber-Rosenberg

Accelerating life sciences product performance is critical to optimizing a new product's life cycle in today's fast-paced, competitive marketplace. There is a significant need for a comprehensive and informative book that reviews the strategy and tactics of the launch process for new life sciences products entering the complex Canadian healthcare market. In this book, the author takes you step by step through the key elements of the launch process. You will learn what it takes to move a new life sciences product from concept development through to the one year post-launch assessment. This book is written for new and experienced leaders in all areas of the bio-pharmaceutical, pharmaceutical and healthcare environments. It unleashes the knowledge you need to effectively plan and launch a life sciences product in order to get the results you want now, and looking ahead to the future. The goal of this book is to make it easier for scientists, especially those new to scientific writing, to write about their results and to get their manuscripts accepted in peer-reviewed journals. The book covers each step throughout the submission process, from organizing and outlining the manuscript, presenting statistical data and results, to what happens during the in-house manuscript review process and what to do if an article is initially rejected. In addition to providing practical exercises on these topics, the book focuses on helping writers distil their research into concise take-home messages for readers, in order to convey information as clearly as possible to the target audience. This book integrates philosophy of biology and philosophy of medicine with the purpose of making philosophy practical for students and scientists. It contains many exercises and examples from live science. Much attention is given to the translation of scientific reasoning into the language of philosophy. The author shows that philosophical models can be used to evaluate science, if the limitations of the

models are recognized so they can be applied in the proper context. On the other hand, some philosophical views of science need to be corrected by science. The book puts philosophy and science in a broader perspective. It integrates practical philosophy and ethics in applications to live science and uncovers limitations of current ethical theory. Analyzes Derrida's 1975 seminar "La vie la mort" as a deconstruction of biology with relevance to his work more broadly. In *Biodeconstruction*, Francesco Vitale demonstrates the key role that the question of life plays in Jacques Derrida's work. In the seminar *La vie la mort* (1975), Derrida engages closely with the life sciences, especially biology and evolution theory. Connecting this line of thought to his analysis of cybernetics in *Of Grammatology*, Vitale shows how Derrida develops a notion of biological life as itself a sort of text that is necessarily open onto further articulations and grafts. This sets the stage for the deconstruction of the traditional opposition between life and death, conceiving of death as an internal condition of the constitution of the living rather than being the opposite of life. It also provides the basis for the deconstruction of the rigidly deterministic concept of the genetic program, an insight that anticipates recent achievements of biological research in epigenetics and sexual reproduction. Finally, Vitale argues that this framework can enrich our understanding of Derrida's late work devoted to political issues, connecting his use of the autoimmunitarian lexicon to the theory of cellular suicide in biology. Francesco Vitale is Professor of Aesthetics at the University of Salerno, Italy. He is the author of *The Last Fortress of Metaphysics: Jacques Derrida and the Deconstruction of Architecture*, also published by SUNY Press, and the author and editor of several books in Italian on Derrida and contemporary French philosophy. Mauro Senatore is a British Academy Fellow at Durham University in the United Kingdom and Adjunct Professor of Contemporary French Philosophy at the Instituto de Humanidades, Universidad Diego Portales, Santiago, Chile. He is the author of *Germes of Death: The Problem of Genesis in Jacques Derrida*, also published by SUNY Press.

Treat yourself to a lively, intuitive, and easy-to-follow introduction to computer programming in Python. The book was written specifically for biologists with little or no prior experience of writing code - with the goal of giving them not only a foundation in Python programming, but also the confidence and inspiration to start using Python in their own research. Virtually all of the examples in the book are drawn from across a wide spectrum of life science research, from simple biochemical calculations and sequence analysis, to modeling the dynamic interactions of genes and proteins in cells, or the drift of genes in an evolving population. Best of all, *Python for the Life Sciences* shows you how to implement all of these projects in Python, one of the most popular programming languages for scientific computing. If you are a life scientist interested in learning Python to jump-start your research, this is the book for you. What You'll Learn Write Python scripts to automate your lab calculations Search for important motifs in genome sequences Use object-oriented programming with Python Study mining interaction network data for patterns Review dynamic modeling of biochemical switches Who This Book Is For Life scientists with little or no programming experience, including undergraduate and graduate students, postdoctoral researchers in academia and industry, medical professionals, and teachers/lecturers. "A comprehensive introduction to using Python for computational biology... A lovely book with humor and perspective" -- John Novembre, Associate Professor of Human Genetics, University of Chicago and MacArthur Fellow "Fun, entertaining, witty and darn useful. A magical portal to the big data revolution" -- Sandro Santagata, Assistant Professor in Pathology, Harvard Medical School "Alex and Gordon's enthusiasm for Python is contagious" -- Glenys Thomson Professor of Integrative Biology, University of California, Berkeley - Illustrating how art, philosophy and mythology juxtapose yet complement scientific thought and evolution, the inclusion of poems and quotes at the end of each chapter serve to make this book truly unique. - Offers a rich blend of historical background on important scientific discoveries, ancient mythologies, and recent phenomena such as SARS - Includes over 50 illustrations with many in color - Provides detailed explanations of technical terminology In this much anticipated first edition, the authors present the basic canons of first-year calculus, but motivated through real biological problems. The two main goals of the text are to provide students with a thorough grounding in calculus concepts and applications, analytical techniques, and numerical methods and to have students understand how, when, and why calculus can be used to model biological phenomena. Both students and instructors will find the book to be a gateway to the exciting

interface of mathematics and biology. Many deep concerns in the life sciences and medicine have to do with the enactment, ordering and displacement of a broad range of values. This volume articulates a pragmatist stance for the study of the making of values in society, exploring various sites within life sciences and medicine and asking how values are at play. This means taking seriously the work scientists, regulators, analysts, professionals and publics regularly do, in order to define what counts as proper conduct in science and health care, what is economically valuable, and what is known and worth knowing. A number of analytical and methodological means to investigate these concerns are presented. The editors introduce a way to indicate an empirically oriented research program into the enacting, ordering and displacing of values. They argue that a research programme of this kind, makes it possible to move orthogonally to the question of what values are, and thus ask how they are constituted. This rectifies some central problems that arise with approaches that depend on stabilized understandings of value. At the heart of it, such a research programme encourages the examination of how and with what means certain things come to count as valuable and desirable, how registers of value are ordered as well as displaced. It further encourages a sense that these matters could be, and sometimes simultaneously are, otherwise. Each chapter has three types of learning aides for students: open-ended questions, multiple-choice questions, and quantitative problems. There is an average of about 50 per chapter. There are also a number of worked examples in the chapters, averaging over 5 per chapter, and almost 600 photos and line drawings. This e-book provides readers a short introductory MATLAB® course oriented towards various collaborative areas of biotechnology and bioscience. The text concentrates on MATLAB® fundamentals and gives examples of its application for various problems in computational biology, molecular biology, biokinetics, biomedicine, bioinformatics, and biotechnology. MATLAB® is presented with examples and applications to various school-level and advanced life science / bioengineering problems - from growing populations of microorganisms and population dynamics, reaction kinetics and reagent concentrations, predator-prey models, to data fitting and time series analysis. The book is divided into 6 chapters containing material carefully selected and tailored to teaching several groups of biotechnology students. The topics are presented in a manner that allows readers to proceed sequentially on the strength of the preceding material. Primary MATLAB® for Life Sciences: A Guide for Beginners is essentially a concise and comprehensive text that provides an easy grasp and to-the-point access to the MATLAB® tool to the community of life sciences and bioengineering undergraduates and specialists. Explains the basic concepts behind the life sciences, including information about the plant and animal kingdoms, zoology, botany, and has chapters on evolution, genetics, genetic engineering, ecology, and the future. Translational Cardiometabolic Genomic Medicine, edited by Dr. Annabelle Rodriguez-Oquendo, is an important resource to postgraduate (medical, dental and graduate) students, postdoctoral fellows, basic scientists, and physician scientists seeking to understand and expand their knowledge base in the field of genomic medicine as it is applied to cardiometabolic diseases. This handbook integrates cutting-edge experimental approaches such as chromatin immunoprecipitation paired end tagging (CHIA-PET), to population studies such as the Multi-Ethnic Study of Atherosclerosis. It encompasses a range of book chapters that highlight bioinformatic approaches to better understanding functionality of the noncoding regions of the human genome to the use of molecular diagnostic testing in predicting increased risk of cardiovascular diseases. Where applicable, this reference also includes chapters related to therapeutic options specifically aligned to molecular targets. Provides comprehensive research on translational genomic medicine Explains state-of-the-art genome editing for stem cells and mouse models with significant relevance to human cardiometabolic disease Includes discussions on the functional effects of single nucleotide polymorphisms and cardiometabolic diseases, stratified by sex and race Encompasses a range of book chapters that highlight bioinformatic approaches to better understanding functionality of the noncoding regions of the human genome Planning a Career in Biomedical and Life Sciences presents useful information, insights, and tips to those pursuing a career in the biomedical and life sciences. The book focuses on making educated choices during schooling, training, and job searching in both the academic and non-academic sectors. The premise of Planning a Career in Biomedical and Life Sciences is that by understanding the full path of a career in either the biomedical or life science fields, you can

proactively plan your career, recognize any opportunities that present themselves, and be well prepared to address important aspects of your own professional development. Topics include choosing your training path, selecting the best supervisor/mentor, and negotiating a job offer. Provides strategies on evaluating biomedical and life sciences education and professional development opportunities in a thorough and systematic fashion. Discusses possible pitfalls and offers insight into how to navigate them successfully at various points of a scientist's career. Offers valuable advice on how to make the best choices for yourself at any stage in your career. Data Science for COVID-19 presents leading-edge research on data science techniques for the detection, mitigation, treatment and elimination of COVID-19. Sections provide an introduction to data science for COVID-19 research, considering past and future pandemics, as well as related Coronavirus variations. Other chapters cover a wide range of Data Science applications concerning COVID-19 research, including Image Analysis and Data Processing, Geoprocessing and tracking, Predictive Systems, Design Cognition, mobile technology, and telemedicine solutions. The book then covers Artificial Intelligence-based solutions, innovative treatment methods, and public safety. Finally, readers will learn about applications of Big Data and new data models for mitigation. Provides a leading-edge survey of Data Science techniques and methods for research, mitigation and treatment of the COVID-19 virus Integrates various Data Science techniques to provide a resource for COVID-19 researchers and clinicians around the world, including both positive and negative research findings Provides insights into innovative data-oriented modeling and predictive techniques from COVID-19 researchers Includes real-world feedback and user experiences from physicians and medical staff from around the world on the effectiveness of applied Data Science solutions Convergence of the life sciences with fields including physical, chemical, mathematical, computational, engineering, and social sciences is a key strategy to tackle complex challenges and achieve new and innovative solutions. However, institutions face a lack of guidance on how to establish effective programs, what challenges they are likely to encounter, and what strategies other organizations have used to address the issues that arise. This advice is needed to harness the excitement generated by the concept of convergence and channel it into the policies, structures, and networks that will enable it to realize its goals. Convergence investigates examples of organizations that have established mechanisms to support convergent research. This report discusses details of current programs, how organizations have chosen to measure success, and what has worked and not worked in varied settings. The report summarizes the lessons learned and provides organizations with strategies to tackle practical needs and implementation challenges in areas such as infrastructure, student education and training, faculty advancement, and inter-institutional partnerships. This is a manual for all life science students studying courses in biochemistry, biotechnology, botany, genetics, microbiology, molecular biology, zoology, nursing, and medicine, based on the author's decades-long experience in the field experiments of life sciences teaching and research. Presents short topics tied to numerical or conceptual ideas, reinforced with worked examples and questions Retaining the user-friendly style of the first edition, this text is designed to eliminate the knowledge gap for those life sciences students who have not studied chemistry at an advanced level. It contains new chapters on - Traditionally, the natural sciences have been divided into two branches: the biological sciences and the physical sciences. Today, an increasing number of scientists are addressing problems lying at the intersection of the two. These problems are most often biological in nature, but examining them through the lens of the physical sciences can yield exciting results and opportunities. For example, one area producing effective cross-discipline research opportunities centers on the dynamics of systems. Equilibrium, multistability, and stochastic behavior-concepts familiar to physicists and chemists-are now being used to tackle issues associated with living systems such as adaptation, feedback, and emergent behavior. Research at the Intersection of the Physical and Life Sciences discusses how some of the most important scientific and societal challenges can be addressed, at least in part, by collaborative research that lies at the intersection of traditional disciplines, including biology, chemistry, and physics. This book describes how some of the mysteries of the biological world are being addressed using tools and techniques developed in the physical sciences, and identifies five areas of potentially transformative research. Work in these areas would have significant impact in both research and society at large by expanding our understanding of the

physical world and by revealing new opportunities for advancing public health, technology, and stewardship of the environment. This book recommends several ways to accelerate such cross-discipline research. Many of these recommendations are directed toward those administering the faculties and resources of our great research institutions-and the stewards of our research funders, making this book an excellent resource for academic and research institutions, scientists, universities, and federal and private funding agencies. A clear and concise survey of the major themes and theories embedded in the history of life science, this book covers the development and significance of scientific methodologies, the relationship between science and society, and the diverse ideologies and current paradigms affecting the evolution and progression of biological studies. The author discusses cell theory, embryology, physiology, microbiology, evolution, genetics, and molecular biology; the Human Genome Project; and genomics and proteomics. Covering the philosophies of ancient civilizations to modern advances in genomics and molecular biology, the book is a unique and comprehensive resource.

Ambient Ionization Mass Spectrometry in Life Sciences: Principles and Applications is a systematic introduction to this rapidly expanding area of study. Underlying principles of each technique are explained in detail, along with discussions on their applications across life science disciplines. Ambient ionization has recently emerged as one of the hottest and fastest growing topics in mass spectrometry, hence this book is not just for analysts and researchers who use and study mass spectrometry. This volume would be of interest to anyone who works in or studies analytical chemistry, omics sciences (including metabolomics), pharmacokinetics, forensic science or drug analysis. Covers the most up-to-date techniques, including DART, DCBI, DESI, PESI, PSI, REIMS and laser-based ambient ionization Includes easy-to-understand pros and cons of each ionization technique to aid in decision-making Provides plentiful examples of life science applications An accessible undergraduate textbook on the essential math concepts used in the life sciences The life sciences deal with a vast array of problems at different spatial, temporal, and organizational scales. The mathematics necessary to describe, model, and analyze these problems is similarly diverse, incorporating quantitative techniques that are rarely taught in standard undergraduate courses. This textbook provides an accessible introduction to these critical mathematical concepts, linking them to biological observation and theory while also presenting the computational tools needed to address problems not readily investigated using mathematics alone. Proven in the classroom and requiring only a background in high school math, *Mathematics for the Life Sciences* doesn't just focus on calculus as do most other textbooks on the subject. It covers deterministic methods and those that incorporate uncertainty, problems in discrete and continuous time, probability, graphing and data analysis, matrix modeling, difference equations, differential equations, and much more. The book uses MATLAB throughout, explaining how to use it, write code, and connect models to data in examples chosen from across the life sciences. Provides undergraduate life science students with a succinct overview of major mathematical concepts that are essential for modern biology Covers all the major quantitative concepts that national reports have identified as the ideal components of an entry-level course for life science students Provides good background for the MCAT, which now includes data-based and statistical reasoning Explicitly links data and math modeling Includes end-of-chapter homework problems, end-of-unit student projects, and select answers to homework problems Uses MATLAB throughout, and MATLAB m-files with an R supplement are available online Prepares students to read with comprehension the growing quantitative literature across the life sciences A solutions manual for professors and an illustration package is available What are the conditions that foster true novelty and allow visionaries to set their eyes on unknown horizons? What have been the challenges that have spawned new innovations, and how have they shaped modern biology? In *Dreamers, Visionaries, and Revolutionaries in the Life Sciences*, editors Oren Harman and Michael R. Dietrich explore these questions through the lives of eighteen exemplary biologists who had grand and often radical ideas that went far beyond the run-of-the-mill science of their peers. From the Frenchman Jean-Baptiste Lamarck, who coined the word "biology" in the early nineteenth century, to the American James Lovelock, for whom the Earth is a living, breathing organism, these dreamers innovated in ways that forced their contemporaries to reexamine comfortable truths. With this collection readers will follow Jane Goodall into the hidden world of apes in African jungles

and Francis Crick as he attacks the problem of consciousness. Join Mary Lasker on her campaign to conquer cancer and follow geneticist George Church as he dreams of bringing back woolly mammoths and Neanderthals. In these lives and the many others featured in these pages, we discover visions that were sometimes fantastical, quixotic, and even threatening and destabilizing, but always a challenge to the status quo. This volume explores problems in the history of science at the intersection of life sciences and agriculture, from the mid-eighteenth to the mid-twentieth century. Taking a comparative national perspective, the book examines agricultural practices in a broad sense, including the practices and disciplines devoted to land management, forestry, soil science, and the improvement and management of crops and livestock. The life sciences considered include genetics, microbiology, ecology, entomology, forestry, and deal with US, European, Russian, Japanese, Indonesian, Chinese contexts. The book shows that the investigation of the border zone of life sciences and agriculture raises many interesting questions about how science develops. In particular it challenges one to re-examine and take seriously the intimate connection between scientific development and the practical goals of managing and improving – perhaps even recreating – the living world to serve human ends. Without close attention to this zone it is not possible to understand the emergence of new disciplines and transformation of old disciplines, to evaluate the role and impact of such major figures of science as Humboldt and Mendel, or to appreciate how much of the history of modern biology has been driven by national ambitions and imperialist expansion in competition with rival nations. A guide to modern scanning electron microscopy instrumentation, methodology and techniques, highlighting novel applications to cell and molecular biology. Peter Atkins and Julio de Paula offer a fully integrated approach to the study of physical chemistry and biology. The potential misuse of advances in life sciences research is raising concerns about national security threats. Dual Use Research of Concern in the Life Sciences: Current Issues and Controversies examines the U.S. strategy for reducing biosecurity risks in life sciences research and considers mechanisms that would allow researchers to manage the dissemination of the results of research while mitigating the potential for harm to national security.

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