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Evolution Education Around the Globe  
Drug Discovery Toxicology

### **Journal of the Royal Society of Western Australia**

Now an HBO® Film starring Oprah Winfrey and Rose Byrne #1 NEW YORK TIMES BESTSELLER Her name was Henrietta Lacks, but scientists know her as HeLa. She was a poor black tobacco farmer whose cells—taken without her knowledge in 1951—became one of the most important tools in medicine, vital for developing the polio vaccine, cloning, gene mapping, and more. Henrietta's cells have been bought and sold by the billions, yet she remains virtually unknown, and her family can't afford health insurance. This phenomenal New York Times bestseller tells a riveting story of the collision between ethics, race, and medicine; of scientific discovery and faith healing; and of a daughter consumed with questions about the mother she never knew.

### **Mathematical Methods of Statistics**

The two-volume set LNBI 11465 and LNBI 11466 constitutes the proceedings of the 7th International Work-Conference on Bioinformatics and Biomedical Engineering, IWBBIO 2019, held in Granada, Spain, in May 2019. The total of 97 papers presented in the proceedings, was carefully reviewed and selected from 301 submissions. The papers are organized in topical sections as follows: Part I: High-throughput genomics: bioinformatics tools and medical applications; omics data acquisition, processing, and analysis; bioinformatics approaches for analyzing cancer sequencing data; next generation sequencing and sequence analysis; structural bioinformatics and function; telemedicine for smart homes and remote monitoring; clustering and analysis of biological sequences with optimization

algorithms; and computational approaches for drug repurposing and personalized medicine. Part II: Bioinformatics for healthcare and diseases; computational genomics/proteomics; computational systems for modelling biological processes; biomedical engineering; biomedical image analysis; and biomedicine and e-health.

## **Space Telescopes and Instrumentation 2016**

The principles of chemical oceanography provide insight into the processes regulating the marine carbon cycle. The text offers a background in chemical oceanography and a description of how chemical elements in seawater and ocean sediments are used as tracers of physical, biological, chemical and geological processes in the ocean. The first seven chapters present basic topics of thermodynamics, isotope systematics and carbonate chemistry, and explain the influence of life on ocean chemistry and how it has evolved in the recent (glacial-interglacial) past. This is followed by topics essential to understanding the carbon cycle, including organic geochemistry, air-sea gas exchange, diffusion and reaction kinetics, the marine and atmosphere carbon cycle and diagenesis in marine sediments. Figures are available to download from [www.cambridge.org/9780521833134](http://www.cambridge.org/9780521833134). Ideal as a textbook for upper-level undergraduates and graduates in oceanography, environmental chemistry, geochemistry and earth science and a valuable reference for researchers in oceanography.

## **The Story of a Life**

The origin of species has fascinated both biologists and the general public since the publication of Darwin's *Origin of Species* in 1859. Significant progress in understanding the process was achieved in the "modern synthesis," when Theodosius Dobzhansky, Ernst Mayr, and others reconciled Mendelian genetics with Darwin's natural selection. Although evolutionary biologists have developed significant new theory and data about speciation in the years since the modern synthesis, this book represents the first systematic attempt to summarize and generalize what mathematical models tell us about the dynamics of speciation. *Fitness Landscapes and the Origin of Species* presents both an overview of the forty years of previous theoretical research and the author's new results. Sergey Gavrilets uses a unified framework based on the notion of fitness landscapes introduced by Sewall Wright in 1932, generalizing this notion to explore the consequences of the huge dimensionality of fitness landscapes that correspond to biological systems. In contrast to previous theoretical work, which was based largely on numerical simulations, Gavrilets develops simple mathematical models that allow for analytical investigation and clear interpretation in biological terms. Covering controversial topics, including sympatric speciation and the effects of sexual conflict on speciation, this book builds for the first time a general, quantitative theory for the origin of species.

## **Comprehensive Electrocardiology**

Patterns of explanation in biology have long been recognized as different from those deployed in other scientific disciplines, especially that of physics. Celebrating

the diversity of interpretative models found in biology, this volume details their varying types as well as explaining their relationships to one another. It covers the key differentials with other sciences in the nature of explanation, such as the existence in biology of varieties unheard of in the physical sciences, such as teleological, evolutionary and even functional explanations. Offering a wealth of fresh analysis of the phenomenon, chapters examine aspects ranging from the role of mathematics in explaining cell development to the complexities thrown up by evolutionary-developmental biology, where explanation is altered by multidisciplinary itself. They cover major domains such as ecology and systems biology, as well as contemporary trends, such as the mechanistic explanations spawned by progress in molecular biology. With contributions from researchers of many different nationalities, the book provides a many-angled perspective on a revealing feature of the discipline of biology.

### **Introduction to Classical and Modern Test Theory**

This volume brings together a distinguished, international list of scholars to explore the role of the learner's intention in knowledge change. Traditional views of knowledge reconstruction placed the impetus for thought change outside the learner's control. The teacher, instructional methods, materials, and activities were identified as the seat of change. Recent perspectives on learning, however, suggest that the learner can play an active, indeed, intentional role in the process of knowledge restructuring. This volume explores this new, innovative view of conceptual change learning using original contributions drawn from renowned scholars in a variety of disciplines. The volume is intended for scholars or advanced students studying knowledge acquisition and change, including educational psychology, developmental psychology, science education, cognitive science, learning science, instructional psychology, and instructional and curriculum studies.

### **Report of a Workshop on the Scope and Nature of Computational Thinking**

This edited book provides a global view on evolution education. It describes the state of evolution education in different countries that are representative of geographical regions around the globe such as Eastern Europe, Western Europe, North Africa, South Africa, North America, South America, Middle East, Far East, South East Asia, Australia, and New Zealand. Studies in evolution education literature can be divided into three main categories: (a) understanding the interrelationships among cognitive, affective, epistemological, and religious factors that are related to peoples' views about evolution, (b) designing, implementing, evaluating evolution education curriculum that reflects contemporary evolution understanding, and (c) reducing antievolutionary attitudes. This volume systematically summarizes the evolution education literature across these three categories for each country or geographical region. The individual chapters thus include common elements that facilitate a cross-cultural meta-analysis. Written for a primarily academic audience, this book provides a much-needed common background for future evolution education research across the globe.

## **Explanation in Biology**

### **Concepts of Biology**

Report of a Workshop on the Scope and Nature of Computational Thinking presents a number of perspectives on the definition and applicability of computational thinking. For example, one idea expressed during the workshop is that computational thinking is a fundamental analytical skill that everyone can use to help solve problems, design systems, and understand human behavior, making it useful in a number of fields. Supporters of this viewpoint believe that computational thinking is comparable to the linguistic, mathematical and logical reasoning taught to all children. Various efforts have been made to introduce K-12 students to the most basic and essential computational concepts and college curricula have tried to provide a basis for life-long learning of increasingly new and advanced computational concepts and technologies. At both ends of this spectrum, however, most efforts have not focused on fundamental concepts. The book discusses what some of those fundamental concepts might be. Report of a Workshop on the Scope and Nature of Computational Thinking explores the idea that as the use of computational devices is becoming increasingly widespread, computational thinking skills should be promulgated more broadly. The book is an excellent resource for professionals in a wide range of fields including educators and scientists.

### **The Triumph of Sociobiology**

La 4e de couverture de la jaquette indique : "How should science be written? It is a question that piqued natural philosophers of the seventeenth century as they experimented with the rhetorical figures, neologisms, verse-forms, and generic variety that characterise the literary texture of their work. Inspired laymen were quick to borrow from the new philosophy and from practising scientists in order to deploy ideas and images from astronomy, optics, chemistry, biology, and medicine. Between them, scientists, natural historians, poets, dramatists, and essayists produced new, adjusted, or hybrid literary forms. The Poetics of Scientific Investigation in Seventeenth-Century England examines those forms and that literary-scientific texture, as well as representations of the scientific--the laboratory, collaborative experimental retirement, and the canons of scientific conversation--and proposes that the writing of seventeenth-century science mirrors the intellectual and investigative processes of early-modern science itself"

### **The Immortal Life of Henrietta Lacks**

### **Systems Biology**

Psychology and Climate Change: Human Perceptions, Impacts, and Responses organizes and summarizes recent psychological research that relates to the issue of climate change. The book covers topics such as how people perceive and respond to climate change, how people understand and communicate about the

issue, how it impacts individuals and communities, particularly vulnerable communities, and how individuals and communities can best prepare for and mitigate negative climate change impacts. It addresses the topic at multiple scales, from individuals to close social networks and communities. Further, it considers the role of social diversity in shaping vulnerability and reactions to climate change. Psychology and Climate Change describes the implications of psychological processes such as perceptions and motivations (e.g., risk perception, motivated cognition, denial), emotional responses, group identities, mental health and well-being, sense of place, and behavior (mitigation and adaptation). The book strives to engage diverse stakeholders, from multiple disciplines in addition to psychology, and at every level of decision making - individual, community, national, and international, to understand the ways in which human capabilities and tendencies can and should shape policy and action to address the urgent and very real issue of climate change. Examines the role of knowledge, norms, experience, and social context in climate change awareness and action Considers the role of identity threat, identity-based motivation, and belonging Presents a conceptual framework for classifying individual and household behavior Develops a model to explain environmentally sustainable behavior Draws on what we know about participation in collective action Describes ways to improve the effectiveness of climate change communication efforts Discusses the difference between acute climate change events and slowly-emerging changes on our mental health Addresses psychological stress and injury related to global climate change from an intersectional justice perspective Promotes individual and community resilience

### **Official Meeting Program**

### **Simutext**

Concepts of Biology is designed for the single-semester introduction to biology course for non-science majors, which for many students is their only college-level science course. As such, this course represents an important opportunity for students to develop the necessary knowledge, tools, and skills to make informed decisions as they continue with their lives. Rather than being mired down with facts and vocabulary, the typical non-science major student needs information presented in a way that is easy to read and understand. Even more importantly, the content should be meaningful. Students do much better when they understand why biology is relevant to their everyday lives. For these reasons, Concepts of Biology is grounded on an evolutionary basis and includes exciting features that highlight careers in the biological sciences and everyday applications of the concepts at hand. We also strive to show the interconnectedness of topics within this extremely broad discipline. In order to meet the needs of today's instructors and students, we maintain the overall organization and coverage found in most syllabi for this course. A strength of Concepts of Biology is that instructors can customize the book, adapting it to the approach that works best in their classroom. Concepts of Biology also includes an innovative art program that incorporates critical thinking and clicker questions to help students understand--and apply--key concepts.

## **Tree Thinking**

?We share a common bond with even the most bizarre beetle of the Peruvian rain forest,? asserts John Janovy Jr. ?A belief in that common bond might, in fact, be the most fundamental characteristic of a biologist.? And biologists see the worth of a plant or an animal not in monetary terms but in its contribution to our understanding of life. The famous naturalist brings a humanist?s vision to this superbly written book. On Becoming a Biologist is grounded in reality, cognizant of practical matters (education and jobs) as well as the ideals that inform the profession?a reverence for life and a responsibility to humankind and its future. Janovy draws on his experiences as a graduate and postdoctoral student, on his rewarding relationships with teachers, and on his fieldwork as a naturalist. This edition includes new information throughout the book regarding pertinent events, issues, and changes in technology.

## **Patterns in Nature**

This volume presents the proceedings of the IFIP TC2 WG 2.5 Conference on Grid-Based Problem Solving Environments: Implications for Development and Deployment of Numerical Software, held in Prescott, Arizona from July 17-21, 2006. The book contains the most up-to-date research on grid-based computing. It will interest users and developers of both grid-based and traditional problem solving environments, developers of grid infrastructure, and developers of numerical software.

## **On Becoming a Biologist**

## **Evolutionary Dynamics of a Natural Population**

As a guide for pharmaceutical professionals to the issues and practices of drug discovery toxicology, this book integrates and reviews the strategy and application of tools and methods at each step of the drug discovery process. • Guides researchers as to what drug safety experiments are both practical and useful • Covers a variety of key topics – safety lead optimization, in vitro-in vivo translation, organ toxicology, ADME, animal models, biomarkers, and -omics tools • Describes what experiments are possible and useful and offers a view into the future, indicating key areas to watch for new predictive methods • Features contributions from firsthand industry experience, giving readers insight into the strategy and execution of predictive toxicology practices

## **Evolutionary Science and Society**

Environmental Biology offers a fresh approach to the topic in demonstrating how biological principles are applied to solve environmental problems.

## **CMBEBIH 2019**

This book explores Systems Biology as the understanding of biological network

behaviors, and in particular their dynamic aspects, which requires the utilization of mathematical modeling tightly linked to experiment. A variety of approaches are discussed here: the identification and validation of networks, the creation of appropriate datasets, the development of tools for data acquisition and software development, and the use of modeling and simulation software in close concert with experiment.

## **Report of a Workshop on the Pedagogical Aspects of Computational Thinking**

In *The Triumph of Sociobiology*, John Alcock reviews the controversy that has surrounded evolutionary studies of human social behavior following the 1975 publication of E.O. Wilson's classic, *Sociobiology, The New Synthesis*. Denounced vehemently as an "ideology" that has justified social evils and inequalities, sociobiology has survived the assault. Twenty-five years after the field was named by Wilson, the approach he championed has successfully demonstrated its value in the study of animal behavior, including the behavior of our own species. Yet, misconceptions remain--to our disadvantage. In this straight-forward, objective approach to the sociobiology debate, noted animal behaviorist John Alcock illuminates how sociobiologists study behavior in all species. He confronts the chief scientific and ideological objections head on, with a compelling analysis of case histories that involve such topics as sexual jealousy, beauty, gender difference, parent-offspring relations, and rape. In so doing, he shows that sociobiology provides the most satisfactory scientific analysis of social behavior available today. Alcock challenges the notion that sociobiology depends on genetic determinism while showing the shortcoming of competing approaches that rely on cultural or environmental determinism. He also presents the practical applications of sociobiology and the progress sociobiological research has made in the search for a more complete understanding of human activities. His reminder that "natural" behavior is not "moral" behavior should quiet opponents fearing misapplication of evolutionary theory to our species. The key misconceptions about this evolutionary field are dissected one by one as the author shows why sociobiologists have had so much success in explaining the puzzling and fascinating social behavior of nonhuman animals and humans alike.

## **Computational Stem Cell Biology: Methods and Protocols**

Sponsored by the National Council of Teachers of Mathematics and written by leading experts in the field of mathematics education, the Handbook is specifically designed to make important, vital scholarship accessible to mathematics education professors, graduate students, educational researchers, staff development directors, curriculum supervisors, and teachers. The Handbook provides a framework for understanding the evolution of the mathematics education research field against the backdrop of well-established conceptual, historical, theoretical, and methodological perspectives. It is an indispensable working tool for everyone interested in pursuing research in mathematics education as the references for each of the Handbook's twenty-nine chapters are complete resources for both current and past work in that particular area.

## **Systems Medicine**

### **Imagining Extinction**

High Performance Silicon Imaging: Fundamentals and Applications of CMOS and CCD Sensors, Second Edition, covers the fundamentals of silicon image sensors, addressing existing performance issues and current and emerging solutions. Silicon imaging is a fast growing area of the semiconductor industry. Its use in cell phone cameras is already well established, with emerging applications including web, security, automotive and digital cinema cameras. The book has been revised to reflect the latest state-of-the-art developments in the field, including 3D imaging, advances in achieving lower signal noise, and new applications for consumer markets. The fundamentals section has also been expanded to include a chapter on the characterization and testing of CMOS and CCD sensors that is crucial to the success of new applications. This book is an excellent resource for both academics and engineers working in the optics, photonics, semiconductor and electronics industries. Covers the fundamentals of silicon-based image sensors and technical advances, focusing on performance issues Looks at image sensors in applications, such as mobile phones, scientific imaging, and TV broadcasting, and in automotive, consumer and biomedical applications Addresses the theory behind 3D imaging and 3D sensor development, including challenges and opportunities

### **Handbook of Research on Mathematics Teaching and Learning**

### **Intentional Conceptual Change**

### **Labster Virtual Lab Experiments: Basic Biology**

This volume gathers the proceedings of the International Conference on Medical and Biological Engineering, which was held from 16 to 18 May 2019 in Banja Luka, Bosnia and Herzegovina. Focusing on the goal to 'Share the Vision', it highlights the latest findings, innovative solutions and emerging challenges in the field of Biomedical Engineering. The book covers a wide range of topics, including: biomedical signal processing, medical physics, biomedical imaging and radiation protection, biosensors and bioinstrumentation, bio-micro/nano technologies, biomaterials, biomechanics, robotics and minimally invasive surgery, and cardiovascular, respiratory and endocrine systems engineering. Further topics include bioinformatics and computational biology, clinical engineering and health technology assessment, health informatics, e-health and telemedicine, artificial intelligence and machine learning in healthcare, as well as pharmaceutical and genetic engineering. Given its scope, the book provides academic researchers, clinical researchers and professionals alike with a timely reference guide to measures for improving the quality of life and healthcare.

### **Biology 2e**



Technological advances in generated molecular and cell biological data are transforming biomedical research. Sequencing, multi-omics and imaging technologies are likely to have deep impact on the future of medical practice. In parallel to technological developments, methodologies to gather, integrate, visualize and analyze heterogeneous and large-scale data sets are needed to develop new approaches for diagnosis, prognosis and therapy. Systems Medicine: Integrative, Qualitative and Computational Approaches is an innovative, interdisciplinary and integrative approach that extends the concept of systems biology and the unprecedented insights that computational methods and mathematical modeling offer of the interactions and network behavior of complex biological systems, to novel clinically relevant applications for the design of more successful prognostic, diagnostic and therapeutic approaches. This 3 volume work features 132 entries from renowned experts in the fields and covers the tools, methods, algorithms and data analysis workflows used for integrating and analyzing multi-dimensional data routinely generated in clinical settings with the aim of providing medical practitioners with robust clinical decision support systems. Importantly the work delves into the applications of systems medicine in areas such as tumor systems biology, metabolic and cardiovascular diseases as well as immunology and infectious diseases amongst others. This is a fundamental resource for biomedical students and researchers as well as medical practitioners who need to need to adopt advances in computational tools and methods into the clinical practice. Encyclopedic coverage: 'one-stop' resource for access to information written by world-leading scholars in the field of Systems Biology and Systems Medicine, with easy cross-referencing of related articles to promote understanding and further research Authoritative: the whole work is authored and edited by recognized experts in the field, with a range of different expertise, ensuring a high quality standard Digitally innovative: Hyperlinked references and further readings, cross-references and diagrams/images will allow readers to easily navigate a wealth of information

### **Computational Modeling of Signaling Networks**

The result of one of the most detailed and careful examinations of the behavior and ecology of a vertebrate ever conducted in the wild, this study addresses one of the major questions in evolutionary biology: why do some populations vary so much in morphological, ecological, behavioral, and physiological traits? By documenting the full range of variation within one population of a species and investigating the causal factors, Rosemary and Peter Grant provide impressive evidence that species are capable of evolutionary change within observable periods of time. Among the most dramatic examples of recent speciation and adaptive diversification are Darwin's Finches, which live in the Galápagos Islands. Darwin theorized that these closely related birds had evolved from a common ancestor to fill the available ecological niches on this remote archipelago. Not only have they evolved into thirteen species, but more recent study has shown that many of them exhibit striking variation in beak structure and other traits. For more than a decade, the Grants have studied one of these species, the large cactus finch, on the isolated Isla Genovesa. They present information on the environment and demographic features of the population, then discuss the range of genetic, ecological, and behavioral factors responsible for the unusually large morphological variation. They place the large cactus finch in its community setting

to better understand its evolution and conclude by discussing the implications of the study for the genetic structure of small populations and the problems of conserving them. They illustrate their findings with an array of drawings, tables, and photographs.

### **The Beak of the Finch**

In 2008, the Computer and Information Science and Engineering Directorate of the National Science Foundation asked the National Research Council (NRC) to conduct two workshops to explore the nature of computational thinking and its cognitive and educational implications. The first workshop focused on the scope and nature of computational thinking and on articulating what "computational thinking for everyone" might mean. A report of that workshop was released in January 2010. Drawing in part on the proceedings of that workshop, Report of a Workshop of Pedagogical Aspects of Computational Thinking, summarizes the second workshop, which was held February 4-5, 2010, in Washington, D.C., and focuses on pedagogical considerations for computational thinking. This workshop was structured to gather pedagogical inputs and insights from educators who have addressed computational thinking in their work with K-12 teachers and students. It illuminates different approaches to computational thinking and explores lessons learned and best practices. Individuals with a broad range of perspectives contributed to this report. Since the workshop was not intended to result in a consensus regarding the scope and nature of computational thinking, Report of a Workshop of Pedagogical Aspects of Computational Thinking does not contain findings or recommendations.

### **High Performance Silicon Imaging**

"The Story of a Life" by J. Breckenridge Ellis. Published by Good Press. Good Press publishes a wide range of titles that encompasses every genre. From well-known classics & literary fiction and non-fiction to forgotten—or yet undiscovered gems—of world literature, we issue the books that need to be read. Each Good Press edition has been meticulously edited and formatted to boost readability for all e-readers and devices. Our goal is to produce eBooks that are user-friendly and accessible to everyone in a high-quality digital format.

### **Bioinformatics and Biomedical Engineering**

Baum and Smith, both professors evolutionary biology and researchers in the field of systematics, present this highly accessible introduction to phylogenetics and its importance in modern biology. Ever since Darwin, the evolutionary histories of organisms have been portrayed in the form of branching trees or "phylogenies." However, the broad significance of the phylogenetic trees has come to be appreciated only quite recently. Phylogenetics has myriad applications in biology, from discovering the features present in ancestral organisms, to finding the sources of invasive species and infectious diseases, to identifying our closest living (and extinct) hominid relatives. Taking a conceptual approach, Tree Thinking introduces readers to the interpretation of phylogenetic trees, how these trees can be reconstructed, and how they can be used to answer biological questions.

Examples and vivid metaphors are incorporated throughout, and each chapter concludes with a set of problems, valuable for both students and teachers. Tree Thinking is must-have textbook for any student seeking a solid foundation in this fundamental area of evolutionary biology.

### **Environmental Biology**

"Ready to blow your mind? Spend 15 seconds reading Clark Aldrich's *The Complete Guide to Simulations and Serious Games*. Witty, fast-paced, and non-linear -- it's Spock meets Alton Brown." -- Lynne Kenney, Psy.D., *The Family Coach* This exciting work offers designers a new way to see the world, model it, and present it through simulations. A groundbreaking resource, it includes a wealth of new tools and terms and a corresponding style guide to help understand them. The author -- a globally recognized industry guru -- covers topics such as virtual experiences, games, simulations, educational simulations, social impact games, practiceware, game-based learning/digital game based learning, immersive learning, and serious games. This book is the first of its kind to present definitions of more than 600 simulation and game terms, concepts, and constructs.

### **Chemical Oceanography and the Marine Carbon Cycle**

Signaling networks are composed of numerous signaling pathways and each has its own intricate component parts. Signaling outputs are dynamic, extraordinarily complex and yet highly specific. In, *Computational Modeling of Signaling Networks: Methods and Protocols*, expert researchers in the field provide key techniques to study signaling networks. Focusing on Systems of ODEs, parameterization of signaling models, signaling pathways, mass-action kinetics and ODEs, and how to use modeling to plan experiments. Written in the highly successful *Methods in Molecular Biology*<sup>TM</sup> series format, the chapters include the kind of detailed description and implementation advice that is crucial for getting optimal results in the laboratory. Thorough and intuitive, *Computational Modeling of Signaling Networks: Methods and Protocols* aids scientists in continuing study of how signaling networks behave in space and time to generate specific biological responses and how those responses impact biology and medicine.

### **The Complete Guide to Simulations and Serious Games**

Winner of the Pulitzer Prize Winner of the Los Angeles Times Book Prize On a desert island in the heart of the Galapagos archipelago, where Darwin received his first inklings of the theory of evolution, two scientists, Peter and Rosemary Grant, have spent twenty years proving that Darwin did not know the strength of his own theory. For among the finches of Daphne Major, natural selection is neither rare nor slow: it is taking place by the hour, and we can watch. In this dramatic story of groundbreaking scientific research, Jonathan Weiner follows these scientists as they watch Darwin's finches and come up with a new understanding of life itself. *The Beak of the Finch* is an elegantly written and compelling masterpiece of theory and explication in the tradition of Stephen Jay Gould. With a new preface.

### **Psychology and Climate Change**

New edition of the classic complete reference book for cardiologists and trainee cardiologists on the theory and practice of electrocardiography, one of the key modalities used for evaluating cardiology patients and deciding on appropriate management strategies.

## **Grid-Based Problem Solving Environments**

This textbook helps you to prepare for both your next exams and practical courses by combining theory with virtual lab simulations. With the “Labster Virtual Lab Experiments” book series you have the unique opportunity to apply your newly acquired knowledge in an interactive learning game that simulates common laboratory experiments. Try out different techniques and work with machines that you otherwise wouldn’t have access to. In this volume on “Basic Biology” you will learn how to work in a biological laboratory and the fundamental theoretical concepts of the following topics: Lab Safety Mitosis Meiosis Cellular Respiration Protein Synthesis In each chapter, you will be introduced to the basic knowledge as well as one virtual lab simulation with a true-to-life challenge. Following a theory section, you will be able to play the corresponding simulation. Each simulation includes quiz questions to reinforce your understanding of the covered topics. 3D animations will show you molecular processes not otherwise visible to the human eye. If you have purchased a printed copy of this book, you get free access to five simulations for the duration of six months. If you’re using the e-book version, you can sign up and buy access to the simulations at [www.labster.com/springer](http://www.labster.com/springer). If you like this book, try out other topics in this series, including “Basic Genetics”, “Basic Biochemistry”, and “Genetics of Human Diseases”.

## **Fitness Landscapes and the Origin of Species (MPB-41)**

### **Evolution Education Around the Globe**

In this classic of statistical mathematical theory, Harald Cramér joins the two major lines of development in the field: while British and American statisticians were developing the science of statistical inference, French and Russian probabilists transformed the classical calculus of probability into a rigorous and pure mathematical theory. The result of Cramér's work is a masterly exposition of the mathematical methods of modern statistics that set the standard that others have since sought to follow. For anyone with a working knowledge of undergraduate mathematics the book is self contained. The first part is an introduction to the fundamental concept of a distribution and of integration with respect to a distribution. The second part contains the general theory of random variables and probability distributions while the third is devoted to the theory of sampling, statistical estimation, and tests of significance.

### **Drug Discovery Toxicology**

What species occur where, and why, and why some places harbor more species than others are basic questions for ecologists. Some species simply live in different places: fish live underwater, birds do not. Adaptations follow: most fish have gills;

birds have lungs. But as *Patterns in Nature* reveals, not all patterns are so trivial. Bringing up to date a critical debate in the field of community ecology between Jared Diamond and colleagues Daniel Simberloff and Edward F. Connor—in which Connor and Simberloff claimed to have demonstrated that island communities did not differ from random expectations—this book undertakes the identification and interpretation of nature's large-scale patterns of species co-occurrence to offer insight into how nature truly works. Travel along any gradient—up a mountain, from forest into desert, from a north-facing slope to a south-facing one, from low tide to high tide on a shoreline, from Arctic tundra to tropical rain forests—and the species change. What explains the patterns of these distributions? Some patterns might be as random as a coin toss. But as with a coin toss, can ecologists differentiate associations caused by a multiplicity of complex, idiosyncratic factors from those structured by some unidentified but simple mechanisms? Can simple mechanisms that structure communities be inferred from observations of which species associations naturally occur? While the answers to these questions are not yet entirely clear, *Patterns in Nature* forces us to reexamine assumptions about species distribution patterns and will be of vital importance to ecologists and conservationists alike.

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