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Biomedical Engineering (iCBBE) 4Th Point-of-Care Technologies Enabling Next-Generation Healthcare Monitoring and Management Nanostructured Lead, Cadmium, and Silver Sulfides Bioinspired Devices The New Health Bioeconomy World Ocean Assessment Synthetic Biology engineering complexity and refactoring cell capabilities The Planetary Emergency Measuring resilience in a volatile world The Biologist's Imagination Spineless Cancer, Radiation Therapy, and the Market Biobanks as Essential Tools for Translational Research: The Belgian Landscape

The Routledge Handbook of Persian Gulf Politics provides a comprehensive and up-to-date analysis of Persian Gulf politics, history, economics, and society. The volume begins its examination of Ottoman rule in the Arabian Peninsula, exploring other dimensions of the region's history up until and after independence in the 1960s and 1970s. Featuring scholars from a range of disciplines, the book demonstrates how the Persian Gulf's current, complex politics is a product of interwoven dynamics rooted in historical developments and memories, profound social,

cultural, and economic changes underway since the 1980s and the 1990s, and inter-state and international relations among both regional actors and between them and the rest of the world. The book comprises a total of 36 individual chapters divided into the following six sections: Historical Context Society and Culture Economic Development Domestic Politics Regional Security Dynamics The Persian Gulf and the World Examining the Persian Gulf's increasing importance in regional politics, diplomacy, economics, and security issues, the volume is a valuable resource for scholars, students, and policy makers interested in political science, history, Gulf studies, and the Middle East.

"Discusses the iconic Blue Marble photo of Earth taken by the Apollo 17 astronauts in December 1972"--

The second edition of Nanotechnology in Biology and Medicine is intended to serve as an authoritative reference source for a broad audience involved in the research, teaching, learning, and practice of nanotechnology in life sciences. This technology, which is on the scale of molecules, has enabled the development of

devices smaller and more efficient than anything currently available. To understand complex biological nanosystems at the cellular level, we urgently need to develop a next-generation nanotechnology tool kit. It is believed that the new advances in genetic engineering, genomics, proteomics, medicine, and biotechnology will depend on our mastering of nanotechnology in the coming decades. The integration of nanotechnology, material sciences, molecular biology, and medicine opens the possibility of detecting and manipulating atoms and molecules using nanodevices, which have the potential for a wide variety of biological research topics and medical uses at the cellular level. This book presents the most recent scientific and technological advances of nanotechnology for use in biology and medicine. Each chapter provides introductory material with an overview of the topic of interest; a description of methods, protocols, instrumentation, and applications; and a collection of published data with an extensive list of references for further details. The goal of this book is to provide a comprehensive overview of the most recent advances in instrumentation, methods, and applications in areas of nanobiotechnology, integrating interdisciplinary research and

development of interest to scientists, engineers, manufacturers, teachers, and students.

This excellent book covers wide-ranging topics in interdisciplinary microbiology, addressing various research aspects and highlighting advanced discoveries and innovations. It presents the fascinating topic of modern biotechnology, including agricultural microbiology, microalgae biotechnology, bio-energy, bioinformatics and metagenomics, environmental microbiology, enzyme technology and marine biology. It presents the most up-to-date areas of microbiology with an emphasis on shedding light on biotechnological advancements and integrating these interdisciplinary microbiology research topics into other biotechnology sub-disciplines. The book raises awareness of the industrial relevance of microbiology, which is key component of this unique collection. The topics include production of antioxidant-glutathione, enzyme-engineering methods, probiotic microbiology and features of microbial xylanases. It also covers some other remarkable aspects of microbiology, like potential health hazards in recreational water and fullerene nanocomposites, which are vital for

biotechnological interventions. This book will be valuable resource for senior undergraduate and graduate students, researchers and other interested professionals or groups working in the interdisciplinary areas of microbiology and biotechnology.

Regenerative Engineering and Developmental Biology: Principles and Applications examines cutting-edge developments in the field of regenerative engineering. Specific attention is given to activities that embrace the importance of integrating developmental biology and tissue engineering, and how this can move beyond repairing damage to body parts to instead regenerate tissues and organs. The text furthermore focusses on the five legs of the field of regenerative engineering, including: materials, developmental biology, stem cells, physics, and clinical translation. This book was written by leading developmental biologists; each chapter examines the processes that these biologists study and how they can be advanced by using the tools available in tissue engineering/biomaterials. Individual chapters are complete with concluding remarks and thoughts on the future of regenerative engineering. A list of references is also provided to aid the reader with further

research. Ultimately, this book achieves two goals. The first encourages the biomedical community to think about how inducing regeneration is an engineering problem. The second goal highlights the discoveries with animal regeneration and how these processes can be engineered to regenerate body parts. Regenerative Engineering and Developmental Biology: Principles and Applications was written with undergraduate and graduate-level biomedical engineering students and biomedical professionals in mind.

The rapid development of new methods for immunological data collection - from multicolor flow cytometry, through single-cell imaging, to deep sequencing - presents us now, for the first time, with the ability to analyze and compare large amounts of immunological data in health, aging and disease. The exponential growth of these datasets, however, challenges the theoretical immunology community to develop methods for data organization and analysis. Furthermore, the need to test hypotheses regarding immune function, and generate predictions regarding the outcomes of medical interventions, necessitates the development of mathematical and computational models covering processes on multiple scales, from the

genetic and molecular to the cellular and system scales. The last few decades have seen the development of methods for presentation and analysis of clonal repertoires (those of T and B lymphocytes) and phenotypic (surface-marker based) repertoires of all lymphocyte types, and for modeling the intricate network of molecular and cellular interactions within the immune systems. This e-Book, which has first appeared as a 'Frontiers in Immunology' research topic, provides a comprehensive, online, open access snapshot of the current state of the art on immune system modeling and analysis.

The domestication of plants and animals is central to the familiar and now outdated story of civilization's emergence. Intertwined with colonialism and imperial expansion, the domestication narrative has informed and justified dominant and often destructive practices. Contending that domestication retains considerable value as an analytical tool, the contributors to Domestication Gone Wild reengage the concept by highlighting sites and forms of domestication occurring in unexpected and marginal sites, from Norwegian fjords and Philippine villages to British falconry cages and South African colonial townships. Challenging

idioms of animal husbandry as human mastery and progress, the contributors push beyond the boundaries of farms, fences, and cages to explore how situated relations with animals and plants are linked to the politics of human difference—and, conversely, how politics are intertwined with plant and animal life.

Ultimately, this volume promotes a novel, decolonizing concept of domestication that radically revises its Euro- and anthropocentric narrative. Contributors. Inger Anneberg, Natasha Fijn, Rune Flikke, Frida Hastrup, Marianne Elisabeth Lien, Knut G. Nustad, Sara Asu Schroer, Heather Anne Swanson, Anna Lowenhaupt Tsing, Mette Vaarst, Gro B. Ween, Jon Henrik Ziegler Remme

The essential guide by one of America's leading doctors to how digital technology enables all of us to take charge of our health A trip to the doctor is almost a guarantee of misery. You'll make an appointment months in advance. You'll probably wait for several hours until you hear "the doctor will see you now"-but only for fifteen minutes! Then you'll wait even longer for lab tests, the results of which you'll likely never see, unless they indicate further (and more invasive) tests, most of which will probably prove unnecessary (much like

physicals themselves). And your bill will be astronomical. In The Patient Will See You Now, Eric Topol, one of the nation's top physicians, shows why medicine does not have to be that way. Instead, you could use your smartphone to get rapid test results from one drop of blood, monitor your vital signs both day and night, and use an artificially intelligent algorithm to receive a diagnosis without having to see a doctor, all at a small fraction of the cost imposed by our modern healthcare system. The change is powered by what Topol calls medicine's "Gutenberg moment." Much as the printing press took learning out of the hands of a priestly class, the mobile internet is doing the same for medicine, giving us unprecedented control over our healthcare. With smartphones in hand, we are no longer beholden to an impersonal and paternalistic system in which "doctor knows best." Medicine has been digitized, Topol argues; now it will be democratized. Computers will replace physicians for many diagnostic tasks, citizen science will give rise to citizen medicine, and enormous data sets will give us new means to attack conditions that have long been incurable. Massive, open, online medicine, where diagnostics are done by Facebook-like comparisons of medical profiles, will enable real-

time, real-world research on massive populations. There's no doubt the path forward will be complicated: the medical establishment will resist these changes, and digitized medicine inevitably raises serious issues surrounding privacy. Nevertheless, the result—better, cheaper, and more human health care—will be worth it. Provocative and engrossing, *The Patient Will See You Now* is essential reading for anyone who thinks they deserve better health care. That is, for all of us.

This book provides new insights into how new biology, and the emergence of "translational" policies to drive the health bioeconomy, is reshaping the innovation ecosystem for new therapies. A key argument is that a broader definition of value (beyond the economic aspects) is needed to understand health innovation in the twenty-first century.

Eugene Goldfield lays out principles of engineering found in the natural world, with a focus on how components of coordinated structures organize themselves into autonomous functional systems. This self-organizing capacity is one of many qualities which can be harnessed to design technologies that can interact seamlessly with human

bodies.

This new Yearbook addresses the question of how policy, place, and organization are made to matter for a new research field to emerge. Bringing together leading historians, sociologists, and organizational researchers on science and technology, the volume answers this question by offering in-depth case studies and comparative perspectives on multiple research fields in their nascent stage, including molecular biology and materials science, nanotechnology, and synthetic biology. The Yearbook brings to bear the lessons of constructivist ethnography and the “practice turn” in Science and Technology Studies (STS) more broadly on the qualitative, comparative, and critical inquiry of new research fields. In doing so, it offers unprecedented insights into the complex interplay of national research policies, regional clusters, particular research institutions, and novel research practices in and for any emerging field of (techno-)science. It systematically investigates national and regional differences, including the variable mobilization of such differences, and probes them for organizational topicality and policy relevance.

It is my great pleasure to present the proceedings of the 8th International Conference on Bioinformatics and Biomedical Engineering (ICBBE 2014), held in Suzhou, China, September 20-22, 2014. I would like to take this opportunity to express my sincere thanks to all the authors and participants for their support to our conference. The continuous researches on Bioinformatics and Biomedical Engineering are now of critical significance to the sustainable development of science, education, culture and the society. Especially in modern times, it plays an important role in the interdisciplinary field among the life science, mathematical science, computer science and electronic information science. More and more scholars and practitioners, both within China and abroad, are committed themselves to the cause of this area. With the development of society and technology, a great variety of research results are emerging. Here, ICBBE provides a platform for academic professionals and industry players to exchange the most updated information and achievements in those exciting research areas. On behalf of the organizing committee, I would like to express my gratitude to our sponsors: Wuhan University and Engineering Information Institute. At the same time, we appreciate the contribution from

***all the paper reviewers and the committee members. It is impossible to organize such a conference without their help. The papers in the proceedings of ICBBE provide details beyond what is possible to be included in an oral presentation and constitute a concise but timely medium for the dissemination of recent research results. I hope that you can find these proceedings interesting, exciting and informative. Thanks again for your support to the ICBBE conference. Prof. Kuo-Chen Chou
ICBBE 2014 Committee Chair***

Volume 36A of Research in the History of Economic Thought and Methodology features a symposium on Bruce Caldwell's Beyond Positivism after 35 years. The volume also features general-research essays from Luis Mireles-Flores and Alain Marciano. Luca Fiorito presents a new discovery from the archives.

Designing EEG Experiments for Studying the Brain: Design Code and Example Datasets details the design of various brain experiments using electroencephalogram (EEG). Providing guidelines for designing an EEG experiment, it is primarily for researchers who want to venture into this field by designing their own experiments as well as those who are excited

about neuroscience and want to explore various applications related to the brain. The first chapter describes how to design an EEG experiment and details the various parameters that should be considered for success, while remaining chapters provide experiment design for a number of neurological applications, both clinical and behavioral. As each chapter is accompanied with experiment design codes and example datasets, those interested can quickly design their own experiments or use the current design for their own purposes. Helpful appendices provide various forms for one's experiment including recruitment forms, feedback forms, ethics forms, and recommendations for related hardware equipment and software for data acquisition, processing, and analysis. Written to assist neuroscientists in experiment designs using EEG Presents a step-by-step approach to designing both clinical and behavioral EEG experiments Includes experiment design codes and example datasets Provides inclusion and exclusion criteria to help correctly identify experiment subjects and the minimum number of samples Includes appendices that provide recruitment forms, ethics forms, and various subjective tests associated with each of the chapters

This volume maintains the successful Current Multidisciplinary Oncology series format. Section I provides a review of fundamental issues including epidemiology, screening and risk reduction, diagnosis and pathologic characterization, staging, and imaging. There is also a chapter on counseling of the high-risk patient. Section II, Treatment of Localized Disease, provides a thorough review of the range of multidisciplinary management options for these patients including a discussion of quality of life impact. Section III, Treatment of Localized Advanced Disease, provides a detailed review of multimodal (medical, surgical, radiologic) therapies. Section IV, Treatment of Advanced Disease, reviews management courses for metastatic disease including the range of novel and experimental agents likely to have major impact on practice. Throughout the volume the emphasis is on multidisciplinary collaboration and decision-making in the management of the prostate cancer patient.

While medical professionals continue to practice traditional allopathic medicine, the public has turned toward nutritional and integrative medical therapies, especially for addressing the proliferation of chronic

diseases. Written by leaders in the academic and scientific world, Nutrition and Integrative Medicine: A Primer for Clinicians presents various modalities to help restore health. This book provides users with a guide to evaluating and recommending nutritional and integrative therapies. The book offers insights on the microbiome of the human body, examines the relationship of human health to the microbiome of the food we ingest, and introduces the concept of "food as information." It provides enlightenment on anti-aging and healing modalities, mind-body medicine, and an investigation of psychological trauma as related to disease causation. Integrative therapies, including water, light, and sound therapy, are explored, and information on healing chronic disease through nutrition, the tooth-body connection, the role of toxins in disease causation, and electromagnetic field hypersensitivity, as well as its management, is presented.

Robots may one day rule the world, but what is a robot-ruled Earth like? Many think the first truly smart robots will be brain emulations or ems. Scan a human brain, then run a model with the same connections on a fast computer, and you have a robot brain, but recognizably

human. Train an em to do some job and copy it a million times: an army of workers is at your disposal. When they can be made cheaply, within perhaps a century, ems will displace humans in most jobs. In this new economic era, the world economy may double in size every few weeks. Some say we can't know the future, especially following such a disruptive new technology, but Professor Robin Hanson sets out to prove them wrong. Applying decades of expertise in physics, computer science, and economics, he uses standard theories to paint a detailed picture of a world dominated by ems. While human lives don't change greatly in the em era, em lives are as different from ours as our lives are from those of our farmer and forager ancestors. Ems make us question common assumptions of moral progress, because they reject many of the values we hold dear. Read about em mind speeds, body sizes, job training and career paths, energy use and cooling infrastructure, virtual reality, aging and retirement, death and immortality, security, wealth inequality, religion, teleportation, identity, cities, politics, law, war, status, friendship and love. This book shows you just how strange your descendants may be, though ems are no stranger than we would appear to our ancestors. To most ems, it seems good to

be an em.

Science Education: A Global Perspective is 'global' both in content and authorship. Its 17 chapters by an assemblage of seasoned and knowledgeable science educators from many parts of the world seek to bring to the fore current developments in science education and their implications. The book thus covers a wide range of topics in science education from various national and international perspectives. These include the nature of science, science and religion, evolution, curriculum and pedagogy, context-based teaching and learning, science and national development, socially-responsible science education, equitable access for women and girls in science and technology education, and the benefits of science education research. It ends on an optimistic note by looking at science education in 50 years' time with a recommendation, among others, for stakeholders to take the responsibility of preparing children towards a blossoming science education sector in an anticipated future world. This book is suitable for use by discerning researchers, teachers, undergraduate and postgraduate students in science education, and policy makers at all levels of education. Other educationalists and

personnel in science and technology vocations will also find it interesting and useful as the reader-motivated approach has guided the presentation of ideas. Science Education: A Global Perspective is a rich compendium of the components of science education in context, practice, and delivery. Dr Bulent Cavas, Professor of Science Education, Dokuz Eylul University, Buca-Izmir, Turkey/President-Elect, International Council of Associations for Science Education (ICASE) This book will be of immense relevance for current and future global strides in training and research in science education. Surinder K. Ghai, Chairman, Sterling Publishers Pvt. Ltd., New Delhi, India This book provides a refreshing insight into the current status and future direction of science education. It will be very useful to researchers, those pursuing undergraduate and post-graduate courses in science education, and all other personnel involved in the policy and practice of science education. Dr. Bennoit Sossou, Director/Country Representative, UNESCO Regional Office in Abuja, Nigeria

"A book full of wonders" —Helen Macdonald, author of H Is for Hawk "Witty, insightful. . . .The story of jellyfish. . . is a significant part of the environmental story. Berwald's engaging

account of these delicate, often ignored creatures shows how much they matter to our oceans' future." —New York Times Book Review Jellyfish have been swimming in our oceans for well over half a billion years, longer than any other animal that lives on the planet. They make a venom so toxic it can kill a human in three minutes. Their sting—microscopic spears that pierce with five million times the acceleration of gravity—is the fastest known motion in the animal kingdom. Made of roughly 95 percent water, some jellies are barely perceptible virtuosos of disguise, while others glow with a luminescence that has revolutionized biotechnology. Yet until recently, jellyfish were largely ignored by science, and they remain among the most poorly understood of ocean dwellers. More than a decade ago, Juli Berwald left a career in ocean science to raise a family in landlocked Austin, Texas, but jellyfish drew her back to the sea. Recent, massive blooms of billions of jellyfish have clogged power plants, decimated fisheries, and caused millions of dollars of damage. Driven by questions about how overfishing, coastal development, and climate change were contributing to a jellyfish population explosion, Juli embarked on a scientific odyssey. She traveled the globe to meet the biologists who

devote their careers to jellies, hitched rides on Japanese fishing boats to see giant jellyfish in the wild, raised jellyfish in her dining room, and throughout it all marveled at the complexity of these alluring and ominous biological wonders. Gracefully blending personal memoir with crystal-clear distillations of science, Spineless is the story of how Juli learned to navigate and ultimately embrace her ambition, her curiosity, and her passion for the natural world. She discovers that jellyfish science is more than just a quest for answers. It's a call to realize our collective responsibility for the planet we share.

Earth and its inhabitants face an unprecedented crisis--the human-caused destruction of the planet's life support systems. Deteriorating climate bringing super storms, mass forest fires, melting glaciers, droughts, extreme heat and rising seas, a decline in food production, soil loss, water pollution and declining fisheries all threaten the future of life on earth with a looming extinction event not seen for 60 million years. Beginning in the 17th century, we developed a civilization based on radical materialism, exploitation of natural resources and the myth of endless economic growth. For all its technological wonders, this "hypercivilization" has proven unsustainable.

This book explores ways we can create an "ecocivilization" compatible with the laws and limits of nature--a new way of living already developing, with new technologies, new forms of social organization and a new story about ourselves and the Earth.

In this expanded second edition of Cognitive Architecture, the authors review new findings in psychology and neuroscience to help architects and planners better understand their clients as the sophisticated mammals they are, arriving in the world with built-in responses to the environment. Discussing key biometric tools to help designers 'see' subliminal human behaviors and suggesting new ways to analyze designs before they are built, this new edition brings readers up-to-date on scientific tools relevant for assessing architecture and the human experience of the built environment. The new edition includes: Over 100 full color photographs and drawings to illustrate key concepts. A new chapter on using biometrics to understand the human experience of place. A conclusion describing how the book's propositions reframe the history of modern architecture. A compelling read for students, professionals, and the general public, Cognitive Architecture takes an inside-out approach to

design, arguing that the more we understand human behavior, the better we can design and plan for it.

This book provides an overview of the multi-dimensional approach for the production of ethanol from lignocellulosic biomass. The sustainability of this biofuel, the current and future status of the technology and its role in waste valorization are also addressed.

Bioethanol from lignocellulosic material has emerged as an alternative to the traditional first-generation bioethanol. The book also discusses various pretreatment methods for effective separation of the various components of lignocellulosic feedstock as well as their advantages, and limitations. It describes the valorization of lignocellulosic waste through the production of bioethanol and emphasizes the significance of waste utilization in managing the production cost of the fuel. Finally, the utilization of genetically engineered plants and microorganisms to increase the conversion efficiency is reviewed.

Magnetic Resonance Imaging in Tissue Engineering provides a unique overview of the field of non-invasive MRI assessment of tissue

engineering and regenerative medicine Establish a dialogue between the tissue-engineering scientists and imaging experts and serves as a guide for tissue engineers and biomaterial developers alike Provides comprehensive details of magnetic resonance imaging (MRI) techniques used to assess a variety of engineered and regenerating tissues and organs Covers cell-based therapies, engineered cartilage, bone, meniscus, tendon, ligaments, cardiovascular, liver and bladder tissue engineering and regeneration assessed by MRI Includes a chapter on oxygen imaging method that predominantly is used for assessing hypoxia in solid tumors for improving radiation therapy but has the ability to provide information on design strategies and cellular viability in tissue engineering regenerative medicine

4th Refuting the Myth of Evolutionism and Exposing the Folly of Clergy Letters The Darwinian theory of evolution begins with facts (science of microevolution) and ends with fiction (myths of macroevolution). The myths are part of our experience, no transitional organisms in the living world, and part of our discoveries, no transitional fossils in such deposits at the Burgess Shale and Chengjiang

sites, where various kinds of organisms appear together in large collection. In his fourth book, Refuting the Myth of Evolutionism and Exposing the Folly of Clergy Letters, author, Michael Ebifegha, stresses that real science is timeless and based on events that are directly or indirectly observable, testable, and repeatable. Challenging evolutionists and their clerical allies who are banning the teaching of creationism in public schools, Ebifegha insists that evolutionism is also outside sciences purview and, therefore, should be banned as well. He reprimands clerics for capitalizing on human knowledge but failing to recognize the validity of Gods personal claim in speech before an audience and in print on stone tablets for having created the world. These interventions, he asserts, fulfills the worlds standard legal requirement for inventors. Ebifegha argues that the inconsistency of imposing evolutionism as scientific truth on the public and banning creationism violates (1) the academic rights of accomplished scientists who disagree with evolutionism on scientific grounds; (2) the US Supreme Courts 1992 declaration, At the heart of liberty is the right to define ones own concept of existence, of meaning, of the universe, and of the mystery of human life; and (3) Gods historical claim to ownership of the

universe. Instead of separation of church and state, Ebifegha recommends separation of worldviews and state.

The power of mapping: principles for visualizing knowledge, illustrated by many stunning large-scale, full-color maps. Maps of physical spaces locate us in the world and help us navigate unfamiliar routes. Maps of topical spaces help us visualize the extent and structure of our collective knowledge; they reveal bursts of activity, pathways of ideas, and borders that beg to be crossed. This book, from the author of Atlas of Science, describes the power of topical maps, providing readers with principles for visualizing knowledge and offering as examples forty large-scale and more than 100 small-scale full-color maps. Today, data literacy is becoming as important as language literacy. Well-designed visualizations can rescue us from a sea of data, helping us to make sense of information, connect ideas, and make better decisions in real time. In Atlas of Knowledge, leading visualization expert Katy Börner makes the case for a systems science approach to science and technology studies and explains different types and levels of analysis. Drawing on fifteen years of teaching and tool development, she introduces a theoretical

framework meant to guide readers through user and task analysis; data preparation, analysis, and visualization; visualization deployment; and the interpretation of science maps. To exemplify the framework, the Atlas features striking and enlightening new maps from the popular “Places & Spaces: Mapping Science” exhibit that range from “Key Events in the Development of the Video Tape Recorder” to “Mobile Landscapes: Location Data from Cell Phones for Urban Analysis” to “Literary Empires: Mapping Temporal and Spatial Settings of Victorian Poetry” to “Seeing Standards: A Visualization of the Metadata Universe.” She also discusses the possible effect of science maps on the practice of science.

"Scholars and policymakers alike agree that innovation in the biosciences is key to future growth. The field continues to shift and expand, and it is certainly changing the way people live their lives in a variety of ways. But despite the lion's share of federal research dollars being devoted to innovation in the biosciences, the field has yet to live up to its billing as a source of economic productivity and growth. With vast untapped potential to imagine and innovate in the biosciences, adaptation of the innovative

model is needed. In The Biologist's Imagination, William Hoffman and Leo Furcht examine the history of innovation in the biosciences, tracing technological innovation from the late eighteenth century to the present and placing special emphasis on how and where technology evolves. Place is key to innovation, from the early industrial age to the rise of the biotechnology industry in the second half of the twentieth century. The book uses the distinct history of bioscientific innovation to discuss current trends as they relate to medicine, agriculture, biofuels, stem-cell research, neuroscience, and more. Ultimately, Hoffman and Furcht argue that, as things currently stand, we fall short in our efforts to innovate in the biosciences; our system of innovation is itself in need of innovation. It needs to adapt to the massive changes brought about by converging technologies, globalization in higher education as well as in finance, and increases in entrepreneurship. The Biologist's Imagination is both an analysis of past models for bioscience innovation and a forward-looking, original argument for how future models should be developed"--

This book presents and analyzes the influence of small size particles of lead, cadmium and

silver sulfide on the properties of nonstoichiometric semiconductors. Important nonstoichiometry aspects in nanostructures are discussed, such as the distribution of sulfur atoms in nanofilms, a non-periodic distribution of the atomic planes in nanoparticles, interdependent changes in crystal structure of nanocrystalline material. Tuning the stoichiometry allows to obtain superionic conductivity and catalytic activity under visible light. The wavelength of the luminescence of nanoparticles changes with the size of the nanoparticles. Various methods to prepare nanostructured sulfides are described. Special attention is given to the hydrochemical bath deposition as a universal method for the synthesis of sulfides as nanofilms, stable colloidal solutions, quantum dots, isolated nanoparticles with a protective shell and heteronanostructures. The effect of nanoparticle size and nonstoichiometry on the band gap, optical and thermal properties of nanostructured sulfides is also considered. The novel applications of sulfide nanoparticles in nanoelectronics, catalysis, nanobiology and nanomedicine are sketched.

This book constitutes the refereed proceedings of the 14th International Conference on

Computational Methods in Systems Biology, CMSB 2016, held in Cambridge, UK, in September 2016. The 20 full papers, 3 tool papers and 9 posters presented were carefully reviewed and selected from 37 regular paper submissions. The topics include formalisms for modeling biological processes; models and their biological applications; frameworks for model verification, validation, analysis, and simulation of biological systems; high-performance computational systems biology and parallel implementations; model inference from experimental data; model integration from biological databases; multi-scale modeling and analysis methods; and computational approaches for synthetic biology.

This book describes the emerging point-of-care (POC) technologies that are paving the way to the next generation healthcare monitoring and management. It provides the readers with comprehensive, up-to-date information about the emerging technologies, such as smartphone-based mobile healthcare technologies, smart devices, commercial personalized POC technologies, paper-based immunoassays (IAs), lab-on-a-chip (LOC)-based IAs, and multiplex IAs. The book also provides guided insights into the POC diabetes management software and

smart applications, and the statistical determination of various bioanalytical parameters. Additionally, the authors discuss the future trends in POC technologies and personalized and integrated healthcare solutions for chronic diseases, such as diabetes, stress, obesity, and cardiovascular disorders. Each POC technology is described comprehensively and analyzed critically with its characteristic features, bioanalytical principles, applications, advantages, limitations, and future trends. This book would be a very useful resource and teaching aid for professionals working in the field of POC technologies, in vitro diagnostics (IVD), mobile healthcare, Big Data, smart technology, software, smart applications, biomedical engineering, biosensors, personalized healthcare, and other disciplines.

Appraising cancer as a major medical market in the 2010s, Wall Street investors placed their bets on single-technology treatment facilities costing \$100-\$300 million each. Critics inside medicine called the widely-publicized proton-center boom "crazy medicine and unsustainable public policy." There was no valid evidence, they claimed, that proton beams were more effective than less costly alternatives. But

developers expected insurance to cover their centers' staggeringly high costs and debts. Was speculation like this new to health care? Cancer, Radiation Therapy, and the Market shows how the radiation therapy specialty in the United States (later called radiation oncology) coevolved with its device industry throughout the twentieth-century. Academic engineers and physicians acquired financing to develop increasingly powerful radiation devices, initiated companies to manufacture the devices competitively, and designed hospital and freestanding procedure units to utilize them. In the process, they incorporated market strategies into medical organization and practice. Although palliative benefits and striking tumor reductions fueled hopes of curing cancer, scientific research all too often found serious patient harm and disappointing beneficial impact on cancer survival. This thoroughly documented and provocative inquiry concludes that public health policy needs to re-evaluate market-driven high-tech medicine and build evidence-based health care systems.

Substantial numbers of the world's chronically poor and malnourished population live in an increasingly volatile world. The dangerous nexus of climate change, rapid population

growth, conflict, and food price volatility already appears to have pushed several poor regions into states of permanent crisis, even as the rest of the world has seen unprecedented progress against poverty. This disturbing state of affairs, along with our expanded knowledge of the intimate interactions between short-term shocks and long-run development, has catalyzed widespread interest in resilience building, and in what such a framework implies for understanding the causes and consequences of acute vulnerability to natural and man-made disasters. In this paper we ask what this paradigm implies for the measurement and analysis of resilience. Resilience is fundamentally about complex dynamics. Slower-moving ecological, economic, demographic, and social stressors create vulnerability to short-run shocks, which in turn can have long-term consequences by reinforcing preexisting vulnerabilities. In our view, this basic conception of resilience has fundamental measurement implications. First, resilience can be measured and understood only through higher-frequency surveys that capture the causes and consequences of time-varying stressors and shocks, including seasonal shocks. Second, resilience can be understood only through surveys that capture the

multidimensional complexity of stressors, shocks, and feedback loops, including the complex interactions between economic, social, and ecological forces. Third, the underlying stressors that create vulnerability, and the resilience-building interventions that reduce vulnerability, can be gauged and evaluated only over the longer term. This conceptualization of resilience motivates us to go a step further than existing research on resilience and on food and nutrition security measurement, by outlining a far more expansive strategy for improving and scaling up the monitoring, measurement, and analysis of the world's most vulnerable populations. We propose the development of a multicountry system of high-frequency, long-term sentinel sites in the world's most vulnerable regions. If implemented along the lines we conceive, this system could be a high-return investment for resilience-building efforts, since it would serve multiple purposes. This system offers the only rigorous means of monitoring vulnerability and resilience in the world's most volatile regions. This system would bolster existing early-warning systems by complementing them with household-level indicators. This system would improve the targeting of emergency resources. This system would be instrumental for

diagnosing the underlying sources of vulnerability, for identifying key thresholds of resilience, and for designing appropriate resilience-building strategies. And this system would provide a rigorous foundation for large-scale evaluations of resilience-building activities. While there are strong justifications for such a system, the devil is necessarily in the details, and much of this paper is concerned with those details. Largely to learn from existing experience, we first review existing measurement strategies that are similar in purpose or design to the sentinel system outlined above. When implemented, long-term, high-frequency measurement systems have often yielded great benefits but been hampered by cost, lack of institutional coordination, and insufficient dissemination and usage of data. The need to keep costs down and benefits widespread therefore motivates us to consider which countries in the world have the highest priority for the development of sentinel sites, based on indicators such as child nutrition and health outcomes, exposure to disasters, and past emergency assistance levels from the international community. We then turn to crucial issues of data collection design by outlining a hybrid sampling and survey design that will help achieve the various objectives

outlined above while keeping costs down. We also argue that the proliferation of mobile phones and other information and communications technologies offers substantial scope for a cost-effective system of this kind, far more so than would have been available in the past. Finally, we consider who should lead and contribute to this ambitious effort. Since the principal advantage of this approach is that it can yield benefits for a wide range of institutions and purposes (relief and development, operations and research, social and biophysical sciences), and since the costs of a long-term commitment to these sentinel surveys would be large indeed for any single agency, we propose the need for a relatively broad consortium of international donors. This consortium should first focus on establishing partnerships with national governments and then commit to long-term resilience monitoring as well as domestic capacity building. With this essential commitment in place, this consortium would then need to secure implementing partners with a permanent presence on the ground, as well as the technical expertise of international organizations of various sorts. Ultimately, we argue, it is only this kind of long-term, cooperative commitment that will provide a scientific evidence base for diagnosing and

resolving the world's worst problems of hunger, poverty, and malnutrition. Only this kind of sentinel system can generate the data and evidence needed to inform actions to build resilience and to help the global community eliminate extreme poverty in the generation ahead. The status quo is simply not enough.

Plasmodesmata (PD) are plant-specific intercellular nanopores defined by specialised domains of the plasma membrane (PM) and the endoplasmic reticulum (ER), both of which contain unique proteins, and probably different lipid compositions than the surrounding bulk membranes. The PD membranes form concentric tubules with a minimal outer diameter of only 50 nm, and the central ER strand constricted to ~10-15 nm, representing one of the narrowest stable membrane tubules in nature. This unique membrane architecture poses many biophysical, structural and functional questions. PM continuity across PD raises the question as to how a locally confined membrane site is established and maintained at PD. There is increasing evidence that the PM within PD may be enriched in membrane 'rafts' or TET web domains. Lipid rafts often function as signalling platforms, in line with the emerging view of PD as central players in plant

defense responses. Lipid-lipid immiscibility could also provide a mechanism for membrane sub- compartmentalisation at PD. Intricate connections of the PM to the wall and the underlying cytoskeleton and ER may anchor the specialised domains locally. The ER within PD is even more strongly modified. Its extreme curvature suggests that it is stabilised by densely packed proteins, potentially members of the reticulon family that tubulate the cortical ER. The diameter of the constricted ER within PD is similar to membrane stalks in dynamin-mediated membrane fission during endocytosis and may need to be stabilised against spontaneous rupture. The function of this extreme membrane constriction, and the reasons why the ER is connected between plant cells remain unknown. Whilst the technically challenging search for the protein components of PD is ongoing, there has been significant recent progress in research on biological membranes that could benefit our understanding of PD function. With this Research Topic, we therefore aim to bring together researchers in the PD field and those in related areas, such as membrane biophysics, membrane composition and fluidity, protein-lipid interactions, lateral membrane heterogeneity, lipid rafts, membrane curvature,

and membrane fusion/fission. We wish to address questions such as: - What mechanisms restrict lateral mobility of proteins and lipids along the PD membranes? - How can specific proteins be targeted to and turned over from membrane domains with restricted lateral access? - What elements (lipids, proteins, membrane curvature, packing order, thickness etc.) may contribute to the identity of PD membranes? - How do the structural and functional features of PD compare to other ER-PM contact sites? - How is the high curvature of the PD ER stabilised and what are possible functions of such a tightly constricted membrane tubule? - Do PD need to be prevented from spontaneous collapse and sealing? - What technologies are available to address these questions that can underpin PD research? We welcome interested individuals to contribute their expertise and develop new hypotheses on the particular biological and biophysical questions posed by PD. We are particularly looking for articles (Original Research Articles, Technical Advances and State-of-the-Art reviews) that would expand on or challenge current perceptions of PD and stimulate discussion.

Microbial Cell Factories is a conceptual,

reference-based source including chapters covering microbial cell factories for industrial developments, microbial biotechnology, sustainable environmental solutions, agriculture practices, microorganisms in food processing, metabolites as next generation food additives/food processing, and microbial cell factories in alternative energy fuel generation. The book highlights trends and developments in the field of microbial products, written by an international team of leading academic and research scholars. Key Selling Features: Highlights trends and developments in microbial biotechnology Systematically reviews microbial cell factories Explores the potential of microbial cell derived industrial production Synthesizes information on environmental and agricultural uses of microbial biotechnology Contributions from an international team of leading scholars

In today's higher education climate academic staff are encouraged to focus not only on the up-to-date content of their teaching, but also to identify the most effective ways to engage students in learning, often alongside other key transferrable skills. This had led to a growing requirement for staff to adopt a scholarly approach to learning and teaching practice, and

to undertake scholarship of learning and teaching as part of ongoing professional development. This text explores broad best practice approaches to undertaking enquiry into learning and teaching in higher education. It provides an introduction for staff who have been educated within a range of academic disciplines, often with high-level but very focused knowledge about, and understandings of, research processes to the potentially new world of educational enquiry. This is complemented by chapters exploring what educational enquiry means in the context of different academic disciplines, including physical sciences, mathematics, engineering, the life sciences, the arts, the humanities, the health professions, and law. It also includes: An overview of research methodology including data collection, literature reviews, good ethical practice, and research dissemination Case studies of actual research projects to support understanding of how to carry out educational enquiry in practice. Lecturers, why waste time waiting for the post arrive? Request and receive your e-inspection copy today!

This book provides extensive information on the key technical design disciplines, education programs, international best practices and

modes of delivery that are aimed at preparing a trans-disciplinary design workforce for the future. It also presents a comprehensive overview of the scope of, and state of the art in, design education. The book highlights signature design education programs from around the globe and across all levels, in both traditional and distance learning settings. Additionally, it discusses professional societies for designers and design educators, as well as the current standards for professional registration, and program accreditation. Reflecting recent advances and emerging trends, it offers a valuable handbook for design practitioners and managers, curriculum designers and program leaders alike. It will also be of interest to students and academics looking to develop a career related to the more technical aspects of design.

Bioelectronics and Medical Devices: From Materials to Devices-Fabrication, Applications and Reliability reviews the latest research on electronic devices used in the healthcare sector, from materials, to applications, including biosensors, rehabilitation devices, drug delivery devices, and devices based on wireless technology. This information is presented from the unique interdisciplinary

perspective of the editors and contributors, all with materials science, biomedical engineering, physics, and chemistry backgrounds. Each applicable chapter includes a discussion of these devices, from materials and fabrication, to reliability and technology applications. Case studies, future research directions and recommendations for additional readings are also included. The book addresses hot topics, such as the latest, state-of-the-art biosensing devices that have the ability for early detection of life-threatening diseases, such as tuberculosis, HIV and cancer. It covers rehabilitation devices and advancements, such as the devices that could be utilized by advanced-stage ALS patients to improve their interactions with the environment. In addition, electronic controlled delivery systems are reviewed, including those that are based on artificial intelligences. Presents the latest topics, including MEMS-based fabrication of biomedical sensors, Internet of Things, certification of medical and drug delivery devices, and electrical safety considerations Presents the interdisciplinary perspective of materials scientists, biomedical engineers, physicists and chemists on biomedical electronic devices Features systematic coverage in each chapter, including recent

advancements in the field, case studies, future research directions, and recommendations for additional readings

One of the key features of biological systems is complexity, where the behavior of high level structures is more than the sum of the direct interactions between single components.

Synthetic Biologists aim to use rational design to build new systems that do not already exist in nature and that exhibit useful biological functions with different levels of complexity.

One such case is metabolic engineering, where, with the advent of genetic and protein engineering, by supplying cells with chemically synthesized non-natural amino acids and sugars as new building blocks, it is now becoming feasible to introduce novel physical and chemical functions and properties into biological entities. The rules of how complex behaviors arise, however, are not yet well understood. For instance, instead of considering cells as inert chassis in which synthetic devices could be easily operated to impart new functions, the presence of these systems may impact cell physiology with reported effects on transcription, translation, metabolic fitness and optimal resource allocation. The result of these changes in the

chassis may be failure of the synthetic device, unexpected or reduced device behavior, or perhaps a more permissive environment in which the synthetic device is allowed to function. While new efforts have already been made to increase standardization and characterization of biological components in order to have well known parts as building blocks for the construction of more complex devices, also new strategies are emerging to better understand the biological dynamics underlying the phenomena we observe. For example, it has been shown that the features of single biological components [i.e. promoter strength, ribosome binding affinity, etc] change depending on the context where the sequences are allocated. Thus, new technical approaches have been adopted to preserve single components activity, as genomic insulation or the utilization of prediction algorithms able to take biological context into account. There have been noteworthy advances for synthetic biology in clinical technologies, biofuel production, and pharmaceuticals production; also, metabolic engineering combined with microbial selection/adaptation and fermentation processes allowed to make remarkable progress towards bio-products formation such as bioethanol, succinate, malate and, more

interestingly, heterologous products or even non-natural metabolites. However, despite the many progresses, it is still clear that ad hoc trial and error predominates over purely bottom-up, rational design approaches in the synthetic biology community. In this scenario, modelling approaches are often used as a descriptive tool rather than for the prediction of complex behaviors. The initial confidence on a pure reductionist approach to the biological world has left space to a new and deeper investigation of the complexity of biological processes to gain new insights and broaden the categories of synthetic biology. In this Research Topic we host contributions that explore and address two areas of Synthetic Biology at the intersection between rational design and natural complexity: (1) the impact of synthetic devices on the host cell, or "chassis" and (2) the impact of context on the synthetic devices. Particular attention will be given to the application of these principles to the rewiring of cell metabolism in a bottom-up fashion to produce non-natural metabolites or chemicals that should eventually serve as a substitute for petrol-derived chemicals, and, on a long-term view, to provide economical, ecological and ethical solutions to today's energetic and societal challenges.

How do poems and novels create a sense of mind? What does literary criticism say in conversation with other disciplines that addresses problems of consciousness? In Paper Minds, Jonathan Kramnick takes up these vital questions, exploring the relations between mind and environment, the literary forms that uncover such associations, and the various fields of study that work to illuminate them. Opening with a discussion of how literary scholarship's particular methods can both complement and remain in tension with corresponding methods particular to the sciences, Paper Minds then turns to a series of sharply defined case studies. Ranging from eighteenth-century poetry and haptic theories of vision, to fiction and contemporary problems of consciousness, to landscapes in which all matter is sentient, to cognitive science and the rise of the novel, Kramnick's essays are united by a central thematic authority. This unified approach of these essays shows us what distinctive knowledge that literary texts and literary criticism can contribute to discussions of perceptual consciousness, created and natural environments, and skilled engagements with the world.

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