How Nature Works The Science Of Self Organized Criticality Copernicus

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How Nature Works - Per Bak 2013-11-11
Self-organized criticality, the spontaneous development of systems to a critical state, is the first general theory of complex systems with a firm mathematical basis. This theory describes how many seemingly desperate aspects of the world, from stock market crashes to mass extinctions, avalanches to solar flares, all share a set of simple, easily described properties. "...a'must read'...Bak writes with such ease and lucidity, and his ideas are so intriguing...essential reading for those interested in complex systems...it will reward a sufficiently skeptical reader." -NATURE "...presents

the theory (self-organized criticality) in a form easily absorbed by the non-mathematically inclined reader." -BOSTON BOOK REVIEW "I picture Bak as a kind of scientific musketeer; flamboyant, touchy, full of swagger and ready to join every fray... His book is written with panache. The style is brisk, the content stimulating. I recommend it as a bracing experience." -NEW SCIENTIST

The Science of Interest - Paul A. O'Keefe 2017-08-01

This exceptional volume analyzes the intricate roles interest plays in cognition, motivation and learning, and daily living, with a special focus on its development and maintenance across life domains. Leading experts discuss a spectrum of interest ranging from curiosity to obsession, and trace its functions in goal-setting, decision-making, self-regulation, and performance. New research refines the current knowledge on student interest in educational settings and the social contexts of interest, with insights into why interest levels change during engagement and in the long run. From these findings, contributors address ways to foster and nurture interest in the therapy room and the classroom, for optimum benefits throughout life. Among the topics covered: · Embedding interest within self-regulation. · Knowledge acquisition at the intersection of situational and individual interest. · The role of interest in motivation and engagement. · The two faces of passion. · Creative geniuses, polymaths, child prodigies, and autistic savants. · The promotion and development of interest. A robust guide to a fascinating area of study, The Science of Interest synthesizes the field's current knowledge of interest and indicates future directions. Its chapters contribute depth and rigor to this growing area of research, and will enhance the work of researchers in education, psychologists, social scientists, and public policymakers.

The Connection of the Physical

Sciences - Mary Somerville 1834

The Psychology of Self-esteem - Nathaniel Branden 1981

How Nature Works - Per Bak 1999-04-23
Self-organized criticality, the spontaneous development of systems to a critical state, is the first general theory of complex systems with a firm mathematical basis. This theory describes how many seemingly desperate aspects of the world, from stock market crashes to mass extinctions, avalanches to solar flares, all share a set of simple, easily described properties. "...a'must read'...Bak writes with such ease and lucidity, and his ideas are so intriguing...essential reading for those interested in complex systems...it will reward a sufficiently skeptical reader." -NATURE "...presents the theory (self-organized criticality) in a form easily absorbed by the non-mathematically inclined reader." -BOSTON BOOK REVIEW "I picture Bak as a kind of scientific musketeer; flamboyant, touchy, full of swagger and ready to join every fray... His book is written with panache. The style is brisk, the content stimulating. I recommend it as a bracing experience." -NEW SCIENTIST

Journey of the Mind: How Thinking Emerged from Chaos - Ogi Ogas 2022-03-08
Two neuroscientists reveal why consciousness exists and how it works by examining eighteen increasingly intelligent minds, from microbes to humankind—and beyond. Why do you exist? How did atoms and molecules transform into sentient creatures that experience longing, regret, compassion, and even marvel at their own existence? What does it truly mean to have a mind—to think? Science has offered few answers to these existential questions until now. Journey of the Mind is the first book to offer a unified account of the mind that explains how consciousness, language, self-awareness, and civilization arose incrementally out of

chaos. The journey begins three billion years ago with the emergence of the universe's simplest possible mind. From there, the book explores the nanoscopic archaeon, whose thinking machinery consists of a handful of molecules, then advances through amoebas, worms, frogs, birds, monkeys, and humans, explaining what each "new" mind could do that previous minds could not. Though they admire the triumph of human consciousness, Ogi Ogas and Sai Gaddam argue that humans are hardly the most sophisticated minds on the planet. The same physical principles that produce human self-awareness are leading cities and nation-states to develop "superminds," and perhaps planting the seeds for even higher forms of consciousness. Written in lively, accessible language accompanied by vivid illustrations, Journey of the Mind is a mind-bending work of popular science, the first general book to share the cutting-edge mathematical basis for consciousness, language, and the self. It shows how a "unified theory of the mind" can explain the mind's greatest mysteries—and offer clues about the ultimate fate of all minds in the universe.

The Science of Self - Supreme Understanding 2016-01-20

THIS BOOK WILL CHANGE THE WAY YOU SEE SCIENCE The Science of Self is a dynamic tour of reality, covering the formation of our universe, the development of life, and the laws that govern these processes and personify themselves as Man. The book introduces readers to hundreds of scientific fields, peering into what quantum mechanics, genetics, anthropology, mathematics, and archaeology have to say about the past, present, and future of Black and brown people. As the first of a five-volume series, this text ventures beyond superficial ideas about history, science, and metaphysics, plunging into questions about the mathematical language that connects, man, God, and the

laws of nature. THIS BOOK WILL CHANGE THE WAY YOU SEE HISTORY Based on over 28 years of combined research, with over 360 references, and a dozen reviewers, this book is history in the making. No other nonfiction text has attempted to cover nearly 14 billion years of Black history. How could all that possibly be Black history? You'll have to read the book to understand. THIS BOOK WILL CHANGE THE WAY YOU SEE REALITY What is the origin of Blackness? Why is melanin found in space? How did life evolve from one ancestor into the diversity we see today? What does quantum physics tell us about consciousness and reality? How did the Black man shape the Earth long before he built the pyramids? What is the mathematical blueprint that is hard-wired into our consciousness? Is there a difference between the mind and the brain? What does it mean to be the Original Man and Woman? All of these questions, and hundreds more, are answered within these pages.

Cured by Nature - Tara Mackey 2016-02-02
Life can be stressful, overwhelming, and sometimes difficult to cope with. Modern medical professionals will tell you to take various prescription medications, which can ultimately do more harm than good. But it doesn't have to be that way! Healing is all in the mind and can be attained through finding harmony in your own life and resorting to natural remedies already provided by the very environment in which you live. Blogger Tara Mackey, who has a background in science, shares her own experiences with stress, depression, and anxiety and teaches you how to break free from them. Growing up, Tara suffered from dependency on various prescription drugs for depression, anxiety, and ADHD. She witnessed her best friend's decline and suicide and watched helplessly as the effects of heroin addiction took a hold of her mother. At age twenty-four, she decided that enough was enough and quit

her prescription meds cold-turkey in search for happiness. Today, she is drug-free, stress-free, and happy. Cured by Nature is Tara's personal story combined with her knowledge and advice to battling personal demons and coming out victorious. Follow Tara as she shows you how to adapt and grow, using various herbal remedies, breathing exercises, and mind-strengthening techniques that will help you be a happier and better you.

From Neurons to Neighborhoods - National Research Council 2000-11-13

How we raise young children is one of today's most highly personalized and sharply politicized issues, in part because each of us can claim some level of "expertise." The debate has intensified as discoveries about our development-in the womb and in the first months and years-have reached the popular media. How can we use our burgeoning knowledge to assure the well-being of all young children, for their own sake as well as for the sake of our nation? Drawing from new findings, this book presents important conclusions about nature-versus-nurture, the impact of being born into a working family, the effect of politics on programs for children, the costs and benefits of intervention, and other issues. The committee issues a series of challenges to decision makers regarding the quality of child care, issues of racial and ethnic diversity, the integration of children's cognitive and emotional development, and more. Authoritative yet accessible, From Neurons to Neighborhoods presents the evidence about "brain wiring" and how kids learn to speak, think, and regulate their behavior. It examines the effect of the climate-family, child care, community-within which the child grows.

Reproducibility and Replicability in Science - National Academies of Sciences, Engineering, and Medicine 2019-10-20

One of the pathways by which the scientific community confirms the validity of a new

scientific discovery is by repeating the research that produced it. When a scientific effort fails to independently confirm the computations or results of a previous study, some fear that it may be a symptom of a lack of rigor in science, while others argue that such an observed inconsistency can be an important precursor to new discovery. Concerns about reproducibility and replicability have been expressed in both scientific and popular media. As these concerns came to light, Congress requested that the National Academies of Sciences, Engineering, and Medicine conduct a study to assess the extent of issues related to reproducibility and replicability and to offer recommendations for improving rigor and transparency in scientific research. Reproducibility and Replicability in Science defines reproducibility and replicability and examines the factors that may lead to non-reproducibility and non-replicability in research. Unlike the typical expectation of reproducibility between two computations, expectations about replicability are more nuanced, and in some cases a lack of replicability can aid the process of scientific discovery. This report provides recommendations to researchers, academic institutions, journals, and funders on steps they can take to improve reproducibility and replicability in science.

The Adventures of Alexander Von Humboldt - Andrea Wulf 2019-04-02

A KIRKUS REVIEWS BEST BOOK OF THE YEAR From the New York Times bestselling author of The Invention of Nature, comes a breathtakingly illustrated and brilliantly evocative recounting of Alexander Von Humboldt's five year expedition in South America. Alexander von Humboldt (1769-1859) was an intrepid explorer and the most famous scientist of his age. His restless life was packed with adventure and discovery, but his most revolutionary idea was a radical vision of nature as a complex and interconnected

global force that does not exist for the use of humankind alone. His theories and ideas were profoundly influenced by a five-year exploration of South America. Now Andrea Wulf partners with artist Lillian Melcher to bring this daring expedition to life, complete with excerpts from Humboldt's own diaries, atlases, and publications. She gives us an intimate portrait of the man who predicted human-induced climate change, fashioned poetic narrative out of scientific observation, and influenced iconic figures such as Simón Bolívar, Thomas Jefferson, Charles Darwin, and John Muir. This gorgeous account of the expedition not only shows how Humboldt honed his groundbreaking understanding of the natural world but also illuminates the man and his passions.

Exploring Complexity - G. Nicolis 1989

Unexpected discoveries in nonequilibrium physics and nonlinear dynamics are changing our understanding of complex phenomena. Recent research has revealed fundamental new properties of matter in far-from-equilibrium conditions, and the prevalence of instability-where small changes in initial conditions may lead to amplified effects.

Connectome - Sebastian Seung 2012-02-07

“Accessible, witty . . . an important new researcher, philosopher and popularizer of brain science . . . on par with cosmology’s Brian Greene and the late Carl Sagan” (The Plain Dealer). One of the Wall Street Journal’s 10 Best Nonfiction Books of the Year and a Publishers Weekly “Top Ten in Science” Title Every person is unique, but science has struggled to pinpoint where, precisely, that uniqueness resides. Our genome may determine our eye color and even aspects of our character. But our friendships, failures, and passions also shape who we are. The question is: How? Sebastian Seung is at the forefront of a revolution in neuroscience. He believes that our identity lies not in our genes, but in the connections

between our brain cells—our particular wiring. Seung and a dedicated group of researchers are leading the effort to map these connections, neuron by neuron, synapse by synapse. It's a monumental effort, but if they succeed, they will uncover the basis of personality, identity, intelligence, memory, and perhaps disorders such as autism and schizophrenia. Connectome is a mind-bending adventure story offering a daring scientific and technological vision for understanding what makes us who we are, as individuals and as a species. "This is complicated stuff, and it is a testament to Dr. Seung's remarkable clarity of exposition that the reader is swept along with his enthusiasm, as he moves from the basics of neuroscience out to the farthest regions of the hypothetical, sketching out a spectacularly illustrated giant map of the universe of man." —TheNew York Times "An elegant primer on what's known about how the brain is organized and how it grows, wires its neurons, perceives its environment, modifies or repairs itself, and stores information. Seung is a clear, lively writer who chooses vivid examples." —TheWashington Post

The World Without Us - Alan Weisman 2008-08-05

A study of what would happen to Earth if the human presence was removed examines our legacy for the planet, from the objects that would vanish without human intervention to those that would become long-lasting remnants of humankind.

The Grand Design - Stephen Hawking 2010-09-07

#1 NEW YORK TIMES BESTSELLER When and how did the universe begin? Why are we here? What is the nature of reality? Is the apparent "grand design" of our universe evidence of a benevolent creator who set things in motion—or does science offer another explanation? In this startling and lavishly illustrated book, Stephen Hawking and Leonard Mlodinow present the most

recent scientific thinking about these and other abiding mysteries of the universe, in nontechnical language marked by brilliance and simplicity. According to quantum theory, the cosmos does not have just a single existence or history. The authors explain that we ourselves are the product of quantum fluctuations in the early universe, and show how quantum theory predicts the "multiverse"—the idea that ours is just one of many universes that appeared spontaneously out of nothing, each with different laws of nature. They conclude with a riveting assessment of M-theory, an explanation of the laws governing our universe that is currently the only viable candidate for a "theory of everything": the unified theory that Einstein was looking for, which, if confirmed, would represent the ultimate triumph of human reason.

Critical Transitions in Nature and Society - Marten Scheffer 2020-11-10

How do we explain the remarkably abrupt changes that sometimes occur in nature and society--and can we predict why and when they happen? This book offers a comprehensive introduction to critical transitions in complex systems--the radical changes that happen at tipping points when thresholds are passed. Marten Scheffer accessibly describes the dynamical systems theory behind critical transitions, covering catastrophe theory, bifurcations, chaos, and more. He gives examples of critical transitions in lakes, oceans, terrestrial ecosystems, climate, evolution, and human societies. And he demonstrates how to deal with these transitions, offering practical guidance on how to predict tipping points, how to prevent "bad" transitions, and how to promote critical transitions that work for us and not against us. Scheffer shows the time is ripe for understanding and managing critical transitions in the vast and complex systems in which we live. This book can also serve as a textbook and includes a

detailed appendix with equations. Provides an accessible introduction to dynamical systems theory Covers critical transitions in lakes, oceans, terrestrial ecosystems, the climate, evolution, and human societies Explains how to predict tipping points Offers strategies for preventing "bad" transitions and triggering "good" ones Features an appendix with equations

Chaos and Fractals - Heinz-Otto Peitgen 2013-06-29

For almost ten years chaos and fractals have been enveloping many areas of mathematics and the natural sciences in their power, creativity and expanse. Reaching far beyond the traditional bounds of mathematics and science to the realms of popular culture, they have captured the attention and enthusiasm of a worldwide audience. The fourteen chapters of the book cover the central ideas and concepts, as well as many related topics including, the Mandelbrot Set, Julia Sets, Cellular Automata, L-Systems, Percolation and Strange Attractors, and each closes with the computer code for a central experiment. In the two appendices, Yuval Fisher discusses the details and ideas of fractal image compression, while Carl J.G. Evertsz and Benoit Mandelbrot introduce the foundations and implications of multifractals.

The Self Delusion - Tom Oliver 2020-01-23

'A thought-provoking and worthwhile read' THE TIMES 'A timely, challenging book' GUARDIAN '[A] rich, intriguing book' NATURE WE ARE MUCH MORE CONNECTED TO NATURE AND EACH OTHER THAN WE REALISE . . . - Most of our 37 trillion cells have such a short lifespan that we are essentially made anew every few weeks - The molecules forming our bodies have been component parts of countless other organisms, from ancient plants to dinosaurs - The bacteria, fungi and viruses that make up our bodies influence our moods and even manipulate our behaviour - Every word and every touch we receive from other people

transforms the neural networks in our brain and changes our sense of self THE SELF DELUSION is an explosive, powerful and inspiring book that brings together overwhelming evidence against the illusion we have of ourselves as independent beings - and explains how understanding our many connections may be the key to a better future.

At Home in the Universe - Stuart Kauffman 1996-11-21

A major scientific revolution has begun, a new paradigm that rivals Darwin's theory in importance. At its heart is the discovery of the order that lies deep within the most complex of systems, from the origin of life, to the workings of giant corporations, to the rise and fall of great civilizations. And more than anyone else, this revolution is the work of one man, Stuart Kauffman, a MacArthur Fellow and visionary pioneer of the new science of complexity. Now, in At Home in the Universe, Kauffman brilliantly weaves together the excitement of intellectual discovery and a fertile mix of insights to give the general reader a fascinating look at this new science--and at the forces for order that lie at the edge of chaos. We all know of instances of spontaneous order in nature--an oil droplet in water forms a sphere, snowflakes have a six-fold symmetry. What we are only now discovering, Kauffman says, is that the range of spontaneous order is enormously greater than we had supposed. Indeed, self-organization is a great undiscovered principle of nature. But how does this spontaneous order arise? Kauffman contends that complexity itself triggers self-organization, or what he calls "order for free," that if enough different molecules pass a certain threshold of complexity, they begin to self-organize into a new entity--a living cell. Kauffman uses the analogy of a thousand buttons on a rug--join two buttons randomly with thread, then another two, and so on. At first, you have isolated pairs; later, small

clusters; but suddenly at around the 500th repetition, a remarkable transformation occurs--much like the phase transition when water abruptly turns to ice--and the buttons link up in one giant network. Likewise, life may have originated when the mix of different molecules in the primordial soup passed a certain level of complexity and self-organized into living entities (if so, then life is not a highly improbable chance event, but almost inevitable). Kauffman uses the basic insight of "order for free" to illuminate a staggering range of phenomena. We see how a single-celled embryo can grow to a highly complex organism with over two hundred different cell types. We learn how the science of complexity extends Darwin's theory of evolution by natural selection: that self-organization, selection, and chance are the engines of the biosphere. And we gain insights into biotechnology, the stunning magic of the new frontier of genetic engineering--generating trillions of novel molecules to find new drugs, vaccines, enzymes, biosensors, and more. Indeed, Kauffman shows that ecosystems, economic systems, and even cultural systems may all evolve according to similar general laws, that tissues and terra cotta evolve in similar ways. And finally, there is a profoundly spiritual element to Kauffman's thought. If, as he argues, life were bound to arise, not as an incalculably improbable accident, but as an expected fulfillment of the natural order, then we truly are at home in the universe. Kauffman's earlier volume, The Origins of Order, written for specialists, received lavish praise. Stephen Jay Gould called it "a landmark and a classic." And Nobel Laureate Philip Anderson wrote that "there are few people in this world who ever ask the right questions of science, and they are the ones who affect its future most profoundly. Stuart Kauffman is one of these." In At Home in the Universe, this visionary thinker takes you

along as he explores new insights into the nature of life.

Returning the Self to Nature - Jeanine M. Canty 2022-11-01 Using the lens of ecopsychology, Returning the Self to Nature shows that the pervasive and extreme forms of narcissism we find in many modern societies are fundamentally the result of alienation from the natural world. But it doesn't have to be that way. Returning the Self to Nature is written for the person who no longer wishes to function in a world that revolves around selfish, disconnected identity models and yearns to step into healthy relationships with one's self, one's community, and our planet. Seeing the suffering of the planet and that of humans as inseparably linked—the ecological crisis as psychological crisis, and vice versa—opens the door to a mutuality of healing between people and nature. At the heart of both chronic and acute forms of narcissism is a socially constructed false self—an isolated, damaged ego in a delusional cycle of selfishness. Through unflinching analysis and meditation practices that encourage visualizing and embodying the wild naturalness of being human, the reader will gain skills to begin experiencing a courageous, pluralistic, and ecological self. This book is an invitation to wake up from the dream of the false self and join the movement toward social and planetary healing.

The Willpower Instinct - Kelly McGonigal 2013-12-31 Based on Stanford University psychologist Kelly McGonigal's wildly popular course "The Science of Willpower," The Willpower Instinct is the first book to explain the science of self-control and how it can be harnessed to improve our health, happiness, and productivity. Informed by the latest research and combining cutting-edge insights from psychology, economics, neuroscience, and medicine, The Willpower Instinct explains exactly what willpower is, how it works, and why it matters. For example, readers will

learn: • Willpower is a mind-body response, not a virtue. It is a biological function that can be improved through mindfulness, exercise, nutrition, and sleep. • Willpower is not an unlimited resource. Too much self-control can actually be bad for your health. • Temptation and stress hijack the brain's systems of self-control, but the brain can be trained for greater willpower • Guilt and shame over your setbacks lead to giving in again, but self-forgiveness and self-compassion boost self-control. • Giving up control is sometimes the only way to gain self-control. • Willpower failures are contagious—you can catch the desire to overspend or overeat from your friends—but you can also catch self-control from the right role models. In the groundbreaking tradition of Getting Things Done, The Willpower Instinct combines life-changing prescriptive advice and complementary exercises to help readers with goals ranging from losing weight to more patient parenting, less procrastination, better health, and greater productivity at work.

The Meme Machine - Susan Blackmore 2000-03-16

Humans are extraordinary creatures, with the unique ability among animals to imitate and so copy from one another ideas, habits, skills, behaviours, inventions, songs, and stories. These are all memes, a term first coined by Richard Dawkins in 1976 in his book The Selfish Gene. Memes, like genes, are replicators, and this enthralling book is an investigation of whether this link between genes and memes can lead to important discoveries about the nature of the inner self. Confronting the deepest questions about our inner selves, with all our emotions, memories, beliefs, and decisions, Susan Blackmore makes a compelling case for the theory that the inner self is merely an illusion created by the memes for the sake of replication.

Complexity and Criticality - Kim Christensen 2005

This book provides a challenging and stimulating introduction to the contemporary topics of complexity and criticality, and explores their common basis of scale invariance, a central unifying theme of the book.Criticality refers to the behaviour of extended systems at a phase transition where scale invariance prevails. The many constituent microscopic parts bring about macroscopic phenomena that cannot be understood by considering a single part alone. The phenomenology of phase transitions is introduced by considering percolation, a simple model with a purely geometrical phase transition, thus enabling the reader to become intuitively familiar with concepts such as scale invariance and renormalisation. The Ising model is then introduced, which captures a thermodynamic phase transition from a disordered to an ordered system as the temperature is lowered in zero external field. By emphasising analogies between percolation and the Ising model, the reader's intuition of phase transitions is developed so that the underlying theoretical formalism may be appreciated fully. These equilibrium systems undergo a phase transition only if an external agent finely tunes certain external parameters to particular values.Besides fractals and phase transitions, there are many examples in Nature of the emergence of such complex behaviour in slowly driven non-equilibrium systems: earthquakes in seismic systems, avalanches in granular media and rainfall in the atmosphere. A class of non-equilibrium systems, not constrained by having to tune external parameters to obtain critical behaviour, is addressed in the framework of simple models, revealing that the repeated application of simple rules may spontaneously give rise to emergent complex behaviour not encoded in the rules themselves. The common basis of complexity and criticality is identified and

applied to a range of non-equilibrium systems. Finally, the reader is invited to speculate whether self-organisation in non-equilibrium systems might be a unifying concept for disparate fields such as statistical mechanics, geophysics and atmospheric physics.Visit http://www.complexityandcriticality.com for animations for the models in the book (available for Windows and Linux), solutions to exercises, as well as a list with corrections.

The Science of Getting Rich - Wallace D. Wattles 2006-03

Claim your right to be rich! Live your dream Acquire wealth Learn a proven method for success Access your inner strength Realize your potential Rediscover the original version of Wallace D. Wattles's 1910 classic, "The Science of Getting Rich"-the forerunner of every personal finance and self-help book ever written. Explore the principles that have shown generations of readers the way to riches and fulfillment in life. Wallace D. Wattles was indeed a man before his time.

Bak's Sand Pile - Theodore Gyle Lewis 2011-02-28

Did the terrorist attacks on the United States in 2001, the massive power blackout of 2003, Hurricane Katrina in 2005, and the Gulf oil spill of 2010 'just happen'-or were these shattering events foreseeable? Do such calamities in fact follow a predictable pattern? Can we plan for the unforeseen by thinking about the unthinkable?Ted Lewis explains the pattern of catastrophes and their underlying cause. In a provocative tour of a volatile world, he guides the reader through mega-fires, fragile power grids, mismanaged telecommunication systems, global terrorist movements, migrating viruses, volatile markets and Internet storms. Modern societies want to avert catastrophes, but the drive to make things faster, cheaper, and more efficient leads to self-organized criticality-the condition of systems on the verge of disaster. This is a double-edged sword.

Everything from biological evolution to political revolution is driven by some collapse, calamity or crisis. To avoid annihilation but allow for progress, we must change the ways in which we understand the patterns and manage systems. Bak's Sand Pile explains how.

Ubiquity - Mark Buchanan 2002-04-23

Critically acclaimed science journalist, Mark Buchanan tells the fascinating story of the discovery that there is a natural structure of instability woven into the fabric of our world, which explains why catastrophes-- both natural and human-- happen. Scientists have recently discovered a new law of nature and its footprints are virtually everywhere-- in the spread of forest fires, mass extinctions, traffic jams, earthquakes, stock-market fluctuations, the rise and fall of nations, and even trends in fashion, music and art. Wherever we look, the world is modelled on a simple template: like a steep pile of sand, it is poised on the brink of instability, with avalanches-- in events, ideas or whatever-- following a universal pattern of change. This remarkable discovery heralds what Mark Buchanan calls the new science of 'ubiquity', a science whose secret lies in the stuff of the everyday world. Combining literary flair with scientific rigour, this enthralling book documents the coming revolution by telling the story of the researchers' exploration of the law, their ingenious work and unexpected insights. Buchanan reveals that we are witnessing the emergence of an extraordinarily powerful new field of science that will help us comprehend the bewildering and unruly rhythms that dominate our lives and may even lead to a true science of the dynamics of human culture and history.

Information - Hans Christian Von Baeyer 2004

In this primer for the information age, von Baeyer presents a clear description of what information is; how concepts of its measurement, meaning, and transmission

evolved; and what its ever-expanding presence portends for the future.

The Better Angels of Our Nature - Steven Pinker 2012-09-25

Presents a controversial history of violence which argues that today's world is the most peaceful time in human existence, drawing on psychological insights into intrinsic values that are causing people to condemn violence as an acceptable measure.

Complexity - Roger Lewin 1999

Examines the field of complexity science, with sections focusing on how the discipline works within computer simulations, natural ecosystems, and various social systems.

Science Fictions - Stuart Ritchie 2020-07-21

An insider’s view of science reveals why many scientific results cannot be relied upon – and how the system can be reformed. Science is how we understand the world. Yet failures in peer review and mistakes in statistics have rendered a shocking number of scientific studies useless – or, worse, badly misleading. Such errors have distorted our knowledge in fields as wide-ranging as medicine, physics, nutrition, education, genetics, economics, and the search for extraterrestrial life. As Science Fictions makes clear, the current system of research funding and publication not only fails to safeguard us from blunders but actively encourages bad science – with sometimes deadly consequences. Stuart Ritchie’s own work challenging an infamous psychology experiment helped spark what is now widely known as the “replication crisis,” the realization that supposed scientific truths are often just plain wrong. Now, he reveals the very human biases, misunderstandings, and deceptions that undermine the scientific endeavor: from contamination in science labs to the secret vaults of failed studies that nobody gets to see; from outright cheating with fake data to the more common,

but still ruinous, temptation to exaggerate mediocre results for a shot at scientific fame. Yet Science Fictions is far from a counsel of despair. Rather, it's a defense of the scientific method against the pressures and perverse incentives that lead scientists to bend the rules. By illustrating the many ways that scientists go wrong, Ritchie gives us the knowledge we need to spot dubious research and points the way to reforms that could make science trustworthy once again.

Making "Nature" - Melinda Baldwin 2015-08-18

Making "Nature" is the first book to chronicle the foundation and development of Nature, one of the world's most influential scientific institutions. Now nearing its hundred and fiftieth year of publication, Nature is the international benchmark for scientific publication. Its contributors include Charles Darwin, Ernest Rutherford, and Stephen Hawking, and it has published many of the most important discoveries in the history of science, including articles on the structure of DNA, the discovery of the neutron, the first cloning of a mammal, and the human genome. But how did Nature become such an essential institution? In Making "Nature," Melinda Baldwin charts the rich history of this extraordinary publication from its foundation in 1869 to current debates about online publishing and open access. This pioneering study not only tells Nature's story but also sheds light on much larger questions about the history of science publishing, changes in scientific communication, and shifting notions of "scientific community." Nature, as Baldwin demonstrates, helped define what science is and what it means to be a scientist.

The Invention of Nature - Andrea Wulf 2016-10-04

NATIONAL BESTSELLER • The acclaimed author of Founding Gardeners reveals the forgotten life of Alexander von Humboldt, the visionary German naturalist whose ideas changed the way we see the

natural world—and in the process created modern environmentalism. "Vivid and exciting.... Wulf's pulsating account brings this dazzling figure back into a dazzling, much-deserved focus." —The Boston Globe Alexander von Humboldt (1769-1859) was the most famous scientist of his age, a visionary German naturalist and polymath whose discoveries forever changed the way we understand the natural world. Among his most revolutionary ideas was a radical conception of nature as a complex and interconnected global force that does not exist for the use of humankind alone. In North America, Humboldt's name still graces towns, counties, parks, bays, lakes, mountains, and a river. And yet the man has been all but forgotten. In this illuminating biography, Andrea Wulf brings Humboldt's extraordinary life back into focus: his prediction of human-induced climate change; his daring expeditions to the highest peaks of South America and to the anthrax-infected steppes of Siberia; his relationships with iconic figures, including Simón Bolívar and Thomas Jefferson; and the lasting influence of his writings on Darwin, Wordsworth, Goethe, Muir, Thoreau, and many others. Brilliantly researched and stunningly written, The Invention of Nature reveals the myriad ways in which Humboldt's ideas form the foundation of modern environmentalism—and reminds us why they are as prescient and vital as ever.

The Nature Fix: Why Nature Makes Us Happier, Healthier, and More Creative - Florence Williams 2017-02-07

"Highly informative and remarkably entertaining." —Elle From forest trails in Korea, to islands in Finland, to eucalyptus groves in California, Florence Williams investigates the science behind nature's positive effects on the brain. Delving into brand-new research, she uncovers the powers of the natural world to improve health, promote reflection and innovation, and

strengthen our relationships. As our modern lives shift dramatically indoors, these ideas—and the answers they yield—are more urgent than ever.

Ubiquity - Mark Buchanan 2001

The author outlines his theory of the "Tipping Point"--that tendency for things to organize themselves into a moment of crisis that results in collapse and an eventual rebuilding process--and applies it to human history. 25,000 first printing.

Self-Organized Criticality - Henrik Jeldtoft Jensen 1998

A clear and concise introduction to this new, cross-disciplinary field.

The Knowledge Machine: How Irrationality Created Modern Science - Michael Strevens 2020-10-13

“The Knowledge Machine is the most stunningly illuminating book of the last several decades regarding the all-important scientific enterprise.” —Rebecca Newberger Goldstein, author of Plato at the Googleplex A paradigm-shifting work, The Knowledge Machine revolutionizes our understanding of the origins and structure of science. • Why is science so powerful? • Why did it take so long—two thousand years after the invention of philosophy and mathematics—for the human race to start using science to learn the secrets of the universe? In a groundbreaking work that blends science, philosophy, and history, leading philosopher of science Michael Strevens answers these challenging questions, showing how science came about only once thinkers stumbled upon the astonishing idea that scientific breakthroughs could be accomplished by breaking the rules of logical argument. Like such classic works as Karl Popper’s The Logic of Scientific Discovery and Thomas Kuhn’s The Structure of Scientific Revolutions, The Knowledge Machine grapples with the meaning and origins of science, using a plethora of vivid historical examples to

demonstrate that scientists willfully ignore religion, theoretical beauty, and even philosophy to embrace a constricted code of argument whose very narrowness channels unprecedented energy into empirical observation and experimentation. Strevens calls this scientific code the iron rule of explanation, and reveals the way in which the rule, precisely because it is unreasonably close-minded, overcomes individual prejudices to lead humanity inexorably toward the secrets of nature. “With a mixture of philosophical and historical argument, and written in an engrossing style” (Alan Ryan), The Knowledge Machine provides captivating portraits of some of the greatest luminaries in science’s history, including Isaac Newton, the chief architect of modern science and its foundational theories of motion and gravitation; William Whewell, perhaps the greatest philosopher-scientist of the early nineteenth century; and Murray Gell-Mann, discoverer of the quark. Today, Strevens argues, in the face of threats from a changing climate and global pandemics, the idiosyncratic but highly effective scientific knowledge machine must be protected from politicians, commercial interests, and even scientists themselves who seek to open it up, to make it less narrow and more rational—and thus to undermine its devotedly empirical search for truth. Rich with illuminating and often delightfully quirky illustrations, The Knowledge Machine, written in a winningly accessible style that belies the import of its revisionist and groundbreaking concepts, radically reframes much of what we thought we knew about the origins of the modern world.

A Hunter-Gatherer's Guide to the 21st Century - Heather Heying 2021-09-14

A provocative exploration of the tension between our evolutionary history and our modern woes—and what we can do about it. We are living through the most prosperous

age in all of human history, yet we are listless, divided, and miserable. Wealth and comfort are unparalleled, but our political landscape is unmoored, and rates of suicide, loneliness, and chronic illness continue to skyrocket. How do we explain the gap between these truths? And how should we respond? For evolutionary biologists Heather Heying and Bret Weinstein, the cause of our troubles is clear: the accelerating rate of change in the modern world has outstripped the capacity of our brains and bodies to adapt. We evolved to live in clans, but today many people don't even know their neighbors' names. In our haste to discard outdated gender roles, we increasingly deny the flesh-and-blood realities of sex—and its ancient roots. The cognitive dissonance spawned by trying to live in a society we are not built for is killing us. In this book, Heying and Weinstein draw on decades of their work teaching in college classrooms and exploring Earth's most biodiverse ecosystems to confront today's pressing social ills—from widespread sleep deprivation and dangerous diets to damaging parenting styles and backward education practices. Asking the questions many modern people are afraid to ask, A Hunter-Gatherer's Guide to the 21st Century outlines a science-based worldview that will empower you to live a better, wiser life.

The Laws of Human Nature - Robert Greene 2019-10-01

From the #1 New York Times-bestselling author of The 48 Laws of Power comes the definitive new book on decoding the behavior of the people around you Robert Greene is a master guide for millions of readers, distilling ancient wisdom and philosophy into essential texts for seekers of power, understanding and mastery. Now he turns to the most important subject of all - understanding people's drives and motivations, even when they are unconscious of them themselves. We are social animals. Our very lives depend on our relationships with people. Knowing why people do

what they do is the most important tool we can possess, without which our other talents can only take us so far. Drawing from the ideas and examples of Pericles, Queen Elizabeth I, Martin Luther King Jr, and many others, Greene teaches us how to detach ourselves from our own emotions and master self-control, how to develop the empathy that leads to insight, how to look behind people's masks, and how to resist conformity to develop your singular sense of purpose. Whether at work, in relationships, or in shaping the world around you, The Laws of Human Nature offers brilliant tactics for success, self-improvement, and self-defense.

From Bacteria to Bach and Back: The Evolution of Minds - Daniel C. Dennett 2017-02-07

"A supremely enjoyable, intoxicating work." —Nature How did we come to have minds? For centuries, poets, philosophers, psychologists, and physicists have wondered how the human mind developed its unrivaled abilities. Disciples of Darwin have explained how natural selection produced plants, but what about the human mind? In From Bacteria to Bach and Back, Daniel C. Dennett builds on recent discoveries from biology and computer science to show, step by step, how a comprehending mind could in fact have arisen from a mindless process of natural selection. A crucial shift occurred when humans developed the ability to share memes, or ways of doing things not based in genetic instinct. Competition among memes produced thinking tools powerful enough that our minds don’t just perceive and react, they create and comprehend. An agenda-setting book for a new generation of philosophers and scientists, From Bacteria to Bach and Back will delight and entertain all those curious about how the mind works.

The COVID-19 Catastrophe - Richard Horton 2020-07-13

The global response to the COVID-19 pandemic is the

greatest science policy failure in a generation. We knew this was coming. Warnings about the threat of a new pandemic have been made repeatedly since the 1980s and it was clear in January that a dangerous new virus was causing a devastating human tragedy in China. And yet the world ignored the warnings. Why? In this short and hard-hitting book, Richard Horton, editor of the medical journal The Lancet, scrutinizes the actions that governments around the world took – and failed to take – as the virus spread from its origins in Wuhan to the global pandemic that it is today. He shows that many Western governments and their scientific advisors made assumptions about the virus and its lethality that turned out to be mistaken. Valuable time was lost while the virus spread unchecked, leaving health systems unprepared for the avalanche of infections that followed. Drawing on his own scientific and medical expertise, Horton outlines the measures that need to be put in place, at both national and international levels, to prevent this kind of catastrophe from happening again. Were supposed to be living in an era where human beings have become the dominant influence on the environment, but COVID-19 has revealed the fragility of our societies and the speed with which our systems can come crashing down. We need to learn the lessons of this pandemic and we need to learn them fast because the next pandemic may arrive sooner than we think.