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*A Biomimicry Primer
Innovation Inspired By
Nature*

The wave of the future
has been around since

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the beginning of times:
it's called Nature. Let
inventor and
entrepreneur Jay Harman
introduce you to
stunning solutions to
some of the world's

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thorniest problems. Why does the bumblebee have better aerodynamics than a 747? How can copying a butterfly wing reduce the world's lighting energy bill by 80%? How

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will fleas' knees and
bees' shoulders help
scientists formulate a
near-perfect rubber?
Today an
interdisciplinary and
international group of

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scientists, inventors
and engineers is turning
to nature to innovate
and find elegant
solutions to human
problems. The principle
driving this

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transformation is called biomimicry, and Harman shares a wide range of examples of how we're borrowing from natural models to invent profitable, green

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solutions to pressing
industrial challenges.
Aimed at a business
audience, aspiring
entrepreneurs,
environmentalists and
general science readers,

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The Shark's Paintbrush
reflects a force of
change in the new global
economy that does more
than simply gratify
human industrial
ambition; it teaches us

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how to live in harmony with nature and opens bright opportunities for a better future.

Nature has always been a source of inspiration for the design of the

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human environment. The analysis of biological constructions can not only lead to astonishing technical solutions but can also inspire the design of architecture.

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Bionics is a fascinating border area between pure research and practical application: biologists, chemists, physicists, mineralogists, and paleontologists meet up

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with material
scientists, engineers,
and architects and
transfer their knowledge
to architecture and
construction. Using
numerous practical

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examples, this richly illustrated introduction traces the process from the understanding of how something functions, to abstraction—for example in computer models—and

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the construction of
initial prototypes,
through to fully
functional manufacture
and production.

The blueprint for an
inspiring regenerative

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economy that avoids
collapse and works for
people and the planet.
Humanity is in a race
with catastrophe. Is the
future one of global
warming, 65 million

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migrants fleeing failed
states, soaring
inequality, and grid-
locked politics? Or one
of empowered
entrepreneurs and
innovators building a

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world that works for everyone? While the specter of collapse looms large, A Finer Future demonstrates that humanity has a chance – just – to thread the

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needle of sustainability
and build a regenerative
economy thorough a
powerful combination of
enlightened
entrepreneurialism,
technology, and

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innovative policy. The authors – world leaders in business, economics, and sustainability – gather the evidence, outline the principles of a regenerative

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economy, and detail a policy roadmap to achieving it, including: Transforming finance and corporations Reimagining energy, agriculture, and the nature of how we

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work Enhancing human well-being Delivering a world that respects ecosystems and human community. Charting the course to a regenerative economy is the most

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important work facing
humanity and A Finer
Future provides the
essential blueprint for
business leaders,
entrepreneurs,
environmentalists,

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politicians,
policymakers, and others
working to create a
world that works for
people and the planet.
A broadly accessible
introduction to robotics

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that spans the most basic concepts and the most novel applications; for students, teachers, and hobbyists. The Robotics Primer offers a broadly accessible

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introduction to robotics
for students at pre-
university and
university levels, robot
hobbyists, and anyone
interested in this
burgeoning field. The

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text takes the reader from the most basic concepts (including perception and movement) to the most novel and sophisticated applications and topics

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(humanoids, shape-shifting robots, space robotics), with an emphasis on what it takes to create autonomous intelligent robot behavior. The core

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concepts of robotics are carried through from fundamental definitions to more complex explanations, all presented in an engaging, conversational

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style that will appeal to readers of different backgrounds. The Robotics Primer covers such topics as the definition of robotics, the history of robotics

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("Where do Robots Come From?"), robot components, locomotion, manipulation, sensors, control, control architectures, representation, behavior

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("Making Your Robot Behave"), navigation, group robotics, learning, and the future of robotics (and its ethical implications). To encourage further

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engagement,
experimentation, and
course and lesson
design, The Robotics
Primer is accompanied by
a free robot programming
exercise workbook that

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implements many of the ideas on the book on iRobot platforms. The Robotics Primer is unique as a principled, pedagogical treatment of the topic that is

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accessible to a broad audience; the only prerequisites are curiosity and attention. It can be used effectively in an educational setting or

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more informally for self-instruction. The Robotics Primer is a springboard for readers of all backgrounds—including students taking robotics

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as an elective outside the major, graduate students preparing to specialize in robotics, and K-12 teachers who bring robotics into their classrooms.

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Bio-Inspired Innovation
and National Security
Biomimicry Resource
Handbook

Carbon Dioxide Capture
and Storage

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An Eames Primer

Engineering Design and
Mathematical Modelling
Research into Design for
a Connected World

A small but influential group of
mainstream global industry

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leaders are now reinventing the role of business in society. They are shifting the focus away from minimizing negative impacts to offering new solutions to global problems that the public sector has been

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unable to tackle alone. In this new competitive environment, societal challenges such as climate change or the alleviation of global poverty are not only risks, but huge business opportunities, not only for niche

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players, but for mainstream business. These leaders are creating "Sustainable Value". They are creating it through the provision of value to both their shareholders and their stakeholders – an ever-growing

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list of diverse constituents impacted by the social, environmental, and financial performance of global business. In short, they are doing well by doing good. In this outstanding book, Chris Laszlo defines,

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illustrates, and shows how business can action 'Sustainable Value' in three profoundly different ways. First, a management fable looks at the experiences of a dynamic business leader as she grapples

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with the new business realities of managing stakeholder, as well as shareholder pressures. Second, with the real thing – inside stories from some of the largest corporations in the world that are successfully

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integrating sustainability into their core activities, not only from a sense of moral correctness, but because it makes good business sense. And, finally, with frameworks, tools, and methods that will

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make sustainable value creation concrete for business practitioners everywhere. This book is a masterful synthesis – part novel and part executive briefing – a refreshing kind of prophetic pragmatism, helping

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leaders anticipate and see the future in the context of the actual. In Sustainable Value Chris Laszlo speaks with resounding clarity to the living challenges, the real dilemmas, and haunting questions of CEOs

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everywhere.

BIG DATA ANALYTICS FOR
INTERNET OF THINGS

Discover the latest
developments in IoT Big Data
with a new resource from
established and emerging

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leaders in the field Big Data Analytics for Internet of Things delivers a comprehensive overview of all aspects of big data analytics in Internet of Things (IoT) systems. The book includes discussions of the

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enabling technologies of IoT data analytics, types of IoT data analytics, challenges in IoT data analytics, demand for IoT data analytics, computing platforms, analytical tools, privacy, and security. The distinguished

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editors have included resources that address key techniques in the analysis of IoT data. The book demonstrates how to select the appropriate techniques to unearth valuable insights from IoT data and

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offers novel designs for IoT systems. With an abiding focus on practical strategies with concrete applications for data analysts and IoT professionals, Big Data Analytics for Internet of Things also offers readers: A

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thorough introduction to the Internet of Things, including IoT architectures, enabling technologies, and applications
An exploration of the intersection between the Internet of Things and Big Data,

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including IoT as a source of Big Data, the unique characteristics of IoT data, etc. A discussion of the IoT data analytics, including the data analytical requirements of IoT data and the types of IoT analytics, including predictive,

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descriptive, and prescriptive analytics A treatment of machine learning techniques for IoT data analytics Perfect for professionals, industry practitioners, and researchers engaged in big data analytics

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related to IoT systems, Big Data Analytics for Internet of Things will also earn a place in the libraries of IoT designers and manufacturers interested in facilitating the efficient implementation of data analytics

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strategies.

This book showcases cutting-edge research papers from the 7th International Conference on Research into Design (ICoRD 2019) – the largest in India in this area – written by eminent

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researchers from across the world on design processes, technologies, methods and tools, and their impact on innovation, for supporting design for a connected world. The theme of ICoRD ' 19 has been “ Design for

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a Connected World ” . While Design traditionally focused on developing products that worked on their own, an emerging trend is to have products with a smart layer that makes them context aware and

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responsive, individually and collectively, through collaboration with other physical and digital objects with which these are connected. The papers in this volume explore these themes, and their key

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focus is connectivity: how do products and their development change in a connected world? The volume will be of interest to researchers, professionals and entrepreneurs working in the areas on industrial design,

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manufacturing, consumer goods, and industrial management who are interested in the use of emerging technologies such as IOT, IIOT, Digital Twins, I4.0 etc. as well as new and emerging methods and tools to

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design new products, systems
and services.

Biomimicry Resource

Handbook A Seed Bank of Best

Practices CreateSpace

The Google Story

A Primer

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A Finer Future

Sustainable Residential Interiors

Designing Regenerative

Cultures

Bio-inspired Innovation and

National Security

Driving Innovation

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**In The Charisma Myth,
Olivia Fox Cabane offered a
groundbreaking approach to
becoming more charismatic.
Now she teams up with
Judah Pollack to reveal how
anyone can train their brain**

Page 65/206

to have more eureka insights. The creative mode in your brain is like a butterfly. It's beautiful and erratic, hard to catch and highly valued as a result. If you want to capture it, you

need a net. Enter the executive mode, the task-oriented network in your brain that help you tie your shoes, run a meeting, or pitch a client. To succeed, you need both modes to

work together--your inner butterfly to be active and free, but your inner net to be ready to spring at the right time and create that "aha!" moment. But is there any way to trigger these insights,

beyond dumb luck? Thanks to recent neuroscience discoveries, we can now explain these breakthrough moments--and also induce them through a series of specific practices. It turns

**out there's a hidden pattern
to all these seemingly
random breakthrough ideas.
From Archimedes' iconic
moment in the bathtub to
designer Adam Cheyer's idea
for Siri, accidental**

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breakthroughs throughout history share a common origin story. In this book, you will learn to master the skills that will transform your brain into a consistent generator of insights.

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Drawing on their extensive coaching and training practice with top Silicon Valley firms, Cabane and Pollack provide a step-by-step process for accessing the part of the brain that

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produces breakthroughs and systematically removing internal blocks. Their tactics range from simple to zany, such as:

- **Imagine an alternate universe where gravity doesn't exist, and the**

social and legal rules that govern it. • Map Disney's Pocahontas story onto James Cameron's Avatar. • Rid yourself of imposter syndrome through mental exercises. • Literally change

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your perspective by climbing a tree. • Stimulate your butterfly mode by watching a foreign film without subtitles. By trying the exercises in this book, readers will emerge with a

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**powerful new capacity for
breakthrough thinking.**

**An inside look at the billion-
dollar enterprise reveals how
the Internet icon grew from
a concept to a social
phenomenon with a bold**

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**mission: to organize all of
the world's information and
make it easily accessible to
people in more than one
hundred languages. Reprint.
50,000 first printing.
We are all investors. We**

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**invest our time, our energy,
our money. We invest every
single day, as citizens, as
consumers, as
businesspeople. At its core,
investing involves
connection, exchange, and**

**mutual benefit. Lately,
however, the primary,
beneficial function of
investing has been
overshadowed by ever-more
mechanized iterations of
finance. We have created**

**funds of funds,
securitizations of
securitizations, and entire
firms whose business is
based on harvesting the
advantage of microseconds
of trading speed. The Nature**

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of Investing calls for a transformation of the investment process from the roots up. Drawing on the author's twenty-plus years of leadership experience in top investment firms, the book

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connects real-world finance with the field of biomimicry. Citing real-life examples and discussing principles from the natural world, The Nature of Investing shows how we can create an

investment framework that is different from the mechanized one currently employed. Readers will discover an approach that realigns investing with the world it was originally meant

to serve. An approach that values resiliency over rigidity and elegant simplicity over synthetic complexity. This is the true nature of investing.

“A clear and crisply written

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**account of machine
intelligence, big data and
the sharing economy. But
McAfee and Brynjolfsson
also wisely acknowledge the
limitations of their
futurology and avoid over-**

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**simplification.” —Financial
Times In The Second
Machine Age, Andrew
McAfee and Erik
Brynjolfsson predicted some
of the far-reaching effects of
digital technologies on our**

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lives and businesses. Now they've written a guide to help readers make the most of our collective future.

Machine | Platform | Crowd outlines the opportunities and challenges inherent in

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**the science fiction
technologies that have come
to life in recent years, like
self-driving cars and 3D
printers, online platforms
for renting outfits and
scheduling workouts, or**

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**crowd-sourced medical
research and financial
instruments.**

**Big Data Analytics for
Internet of Things
The Art and Practice of
Breakthrough Thinking**

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**New England's Roadside
Ecology
Computational Methods and
Tools
How Companies Are Using
Nature's Strategies to
Succeed**

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**The Ontology of Design
Research
Innovative Production And
Construction: Transforming
Construction Through
Emerging Technologies
*Engineering Design and***

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***Mathematical Modelling:
Concepts and Applications
consists of chapters that span
the Engineering design and
mathematical modelling
domains. Engineering design
and mathematical modelling***

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are key tools/techniques in the Science, Technology and Innovation spheres. Whilst engineering design is concerned with the creation of functional innovative products and processes, mathematical

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modelling seeks to utilize mathematical principles and concepts to describe and control real world phenomena. Both of these can be useful tools for spurring and hastening progress in

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developing countries. They are also areas where Africa needs to 'skill-up' in order to build a technological base. The chapters in this book cover the relevant research trends in the fields of both engineering

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***design and mathematical
modelling. This book was
originally published as a
special issue of the African
Journal of Science,
Technology, Innovation and
Development.***

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This book seeks to establish the meaning of design research, its role in the field, and the characteristics that differentiate research in design from research in other fields. The author introduces a

model to explain the relationship between the components of the ontological reality of design: the designed object, the designer, and the user. Addressing design research across disciplines,

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the author establishes a foundational understanding of research, and research paradigms, for the design disciplines. This will be crucial for the emerging field of design research to find its own

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***identity and move forward,
building its own knowledge
base as it finds its positioning
between science and art. The
book will be of interest to
scholars working in design
history, design studies,***

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graphic design, industrial design, interior design, architecture, fashion design, and service design.

"The first book to capture the philosophy and spirit behind the work of Charles and Ray

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Eames, this book offers an in-depth look at the couple's prolific legacy-one that has placed them among the most important designers of the twentieth century. Those who know one or two aspects of

the Eameses' work are often surprised to learn how far and wide their range extended. Yet throughout their myriad works, from architecture and furniture to exhibition design and filmmaking, their core

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philosophy prevails." - inside cover.

This book shares a collection of novel ways to re-conceptualize and envision the moral imperatives of consumption, thereby

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***providing invigorating insights
for future dialogue and
intellectual and social action.
It privileges a consumer moral
leadership imperative, which
augments the conventional
management imperatives of***

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***sustainability, ethics,
simplicity and environmental
integrity.***

The Upcycle

The Robotics Primer

Beyond

Sustainability--Designing for

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Abundance

***The Net and the Butterfly
Towards a Natural Social
Contract***

***Bio-inspired Design. Le
prospettive di un design per la
sostenibilità ambientale***

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guidato dalla natura

***Machine, Platform, Crowd:
Harnessing Our Digital Future***

Between the 18th and 19th
centuries, Britain experienced
massive leaps in technological,
scientific, and economical

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advancement

Design makes a tremendous impact on the produced world in terms of usability, resources, understanding, and priorities. What we produce, how we serve customers and other stakeholders, and even how we

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understand how the world works is all affected by the design of models and solutions. Designers have an unprecedented opportunity to use their skills to make meaningful, sustainable change in the world—if they know how to focus their skills,

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time, and agendas. In Design is the Problem: The Future of Design Must be Sustainable, Nathan Shedroff examines how the endemic culture of design often creates unsustainable solutions, and shows how designers can bake sustainability

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into their design processes in order to produce more sustainable solutions.

Repackaged with a new afterword, this "valuable and entertaining" (New York Times Book Review) book explores how scientists are adapting nature's

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best ideas to solve tough 21st century problems. Biomimicry is rapidly transforming life on earth. Biomimics study nature's most successful ideas over the past 3.5 million years, and adapt them for human use. The results are revolutionizing how materials

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are invented and how we compute, heal ourselves, repair the environment, and feed the world. Janine Benyus takes readers into the lab and in the field with maverick thinkers as they: discover miracle drugs by watching what chimps eat when

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they're sick; learn how to create
by watching spiders weave
fibers; harness energy by
examining how a leaf converts
sunlight into fuel in trillionths of
a second; and many more
examples. Composed of stories of
vision and invention,

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personalities and pipe dreams,
Biomimicry is must reading for
anyone interested in the shape of
our future.

Nature is the world's foremost
designer. With billions of years of
experience and boasting the most
extensive laboratory available, it

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conducts research in every branch of engineering and science. Nature's designs and capabilities have always inspired technology, from the use of tongs and tweezers to genetic algorithms and autonomous legged robots. Taking a systems

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perspective rather than focusing narrowly on materials or chemistry aspects, Biomimetics: Biologically Inspired Technologies examines the field from every angle. The book contains pioneering approaches to biomimetics including a new

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perspective on the mechanization of cognition and intelligence, as well as defense and attack strategies in nature, their applications, and potential. It surveys the field from modeling to applications and from nano- to macro-scales, beginning with an

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introduction to principles of using biology to inspire designs as well as biological mechanisms as models for technology. This innovative guide discusses evolutionary robotics; genetic algorithms; molecular machines; multifunctional, biological-, and

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nano- materials; nastic structures inspired by plants; and functional surfaces in biology. Looking inward at biological systems, the book covers the topics of biomimetic materials, structures, control, cognition, artificial muscles, biosensors that mimic

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senses, artificial organs, and interfaces between engineered and biological systems. The final chapter contemplates the future of the field and outlines the challenges ahead. Featuring extensive illustrations, including a 32-page full-color insert,

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Biomimetics: Biologically Inspired Technologies provides unmatched breadth of scope as well as lucid illumination of this promising field.

Innovation Inspired by Nature
Proceedings of the Art and
Design International Conference

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(AnDIC 2016)

Explore 30 of the Region's
Unique Natural Areas
The Future of Design Must Be
Sustainable
Transformative Social-Ecological
Innovation for a Sustainable,
Healthy and Just Society

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Learning from Nature

The Ecology of Commerce

**This is a 'Whole Earth
Catalog' for the 21st
century: an impressive
and wide-ranging
analysis of what's wrong**

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**with our societies,
organizations, ideologies,
worldviews and cultures -
and how to put them
right. The book covers
the finance system,
agriculture, design,**

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**ecology, economy,
sustainability,
organizations and society
at large.**

**IPCC Report on sources,
capture, transport, and
storage of CO₂, for**

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researchers, policy-makers and engineers. Biomimicry, the practice of observing then mimicking nature's strategies to solve business challenges,

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offers a path to healthy profit while working in partnership, and even reciprocity, with the natural world. Other books have described biomimicry, its uses, and

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its benefits. This book shows readers how to create their own biomimetic or bioinspired solutions with clear benefits to the bottom line, the environment,

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**and people. Fashioned
through storytelling, this
book blends snapshots of
five successful companies
- Nike, Interface, Inc.,
PAX Scientific, Sharklet
Technologies, and**

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Encycle - which decided to partner with nature by deploying biomimicry. The book details how they discovered the practices, introduced them to staff, engaged in

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**the process, and
measured outcomes. The
book concludes with
challenges for readers to
determine their own next
steps in business and
offers practical and**

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useful resources to get there. By revealing the stories of each professional's journey with lessons they learned, then providing resources and issuing a

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**challenge and pathway to
do business better, this
book serves as a tool for
entrepreneurs, seasoned
professionals, and
students to emulate
nature's brilliance, apply**

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**it at work, and contribute
to a healthier, more
prosperous world.
Product and Process
Design: Driving
Innovation is a
comprehensive textbook**

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**for students and
industrial professionals.
It treats the combined
design of innovative
products and their
innovative manufacturing
processes, providing**

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**specific methods for BSc,
MSc, PDEng and PhD
courses. Students,
industrial innovators and
managers are guided
through all design steps
in all innovation stages**

(discovery, concept, feasibility, development, detailed engineering, and implementation) to successfully obtain novel products and their novel processes. The authors'

**decades of innovation
experience in industry, as
well as in teaching BSc,
MSc, and post-academic
product and process
design courses, thereby
including the latest**

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Design

Provides a visionary blueprint for a marketplace where businesses and environmentalists work together, showing companies how to redesign and manufacture products in innovative ways,

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reeducate customers, and work closely with government toward a profitable, productive, and ecologically sound future. Reprint. Tackles resource scarcity and sustainability and describes how everyday objects from chairs to

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cars and factories are being redesigned to sustain and promote life.

The Biomimicry Resource Handbook: A Seed Bank of Best Practices contains over 250 pages of our most current biomimicry

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thinking, methodology, and tools for naturalizing biomimicry into the culture. We believe there is no better design partner than nature. But biomimicry is more than just looking at the shape of a flower or dragonfly and becoming newly

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inspired; it's a methodology that's being used by some of the biggest companies and innovative universities in the world. While reading this text you'll be immersed into the world of Biomimicry the “ verb ” , you'll

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gain a competitive edge, and a fresh perspective on how the world around us can, does, and should work. After reading the text, you'll be well on your way to thinking in systems, designing in context, identifying patterns, and

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most importantly seeing the millions of organisms around us....differently. The text is directly applicable to designers, biologists, engineers, entrepreneurs and intrapreneurs, but has also proven valuable to students, educators,

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and a wide variety of other disciplines. Visit biomimicry.net to learn more. A digital version is available at

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This open access book is a 2022 Nautilus Gold Medal winner in the

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category "World Cultures'
Transformational Growth &
Development". It states that the
societal fault lines of our times are
deeply intertwined and that they
confront us with challenges
affecting the security, fairness and

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sustainability of our societies. The author, Prof. Dr. Patrick Huntjens, argues that overcoming these existential challenges will require a fundamental shift from our current anthropocentric and economic growth-oriented approach to a

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more ecocentric and regenerative approach. He advocates for a Natural Social Contract that emphasizes long-term sustainability and the general welfare of both humankind and planet Earth. Achieving this crucial

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balance calls for an end to unlimited economic growth, overconsumption and over-individualisation for the benefit of ourselves, our planet, and future generations. To this end, sustainability, health, and justice

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in all social-ecological systems will require systemic innovation and prioritizing a collective effort. The Transformative Social-Ecological Innovation (TSEI) framework presented in this book serves that cause. It helps to diagnose and

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advance innovation and spur change across sectors, disciplines, and at different levels of governance. Altogether, TSEI identifies intervention points and formulates jointly developed and shared solutions to inform

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policymakers, administrators, concerned citizens, and professionals dedicated towards a more sustainable, healthy and just society. A wide readership of students, researchers, practitioners and policy makers interested in

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social innovation, transition studies, development studies, social policy, social justice, climate change, environmental studies, political science and economics will find this cutting-edge book particularly useful. “ As a

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sustainability transition researcher,
I am truly excited about this book.
Two unique aspects of the book
are that it considers bigger
transformation issues (such as
societies ' relationship with
nature, purpose and justice) than

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those studied in transition studies and offers analytical frameworks and methods for taking up the challenge of achieving change on the ground. ” - Prof. Dr. René Kemp, United Nations University and Maastricht Sustainability

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Biomimicry is a revolutionary
new science that analyzes
nature's best ideas--spider silk
and eyes, seashells and brain

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cells, photosynthesis and DNA--and adapts them for human use. Janine Benyus takes us into the lab and out in the field with the maverick researchers who are discovering nature's ingenious solutions to

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the problem of human survival:
studying leaves to learn how to
make microscopic solar power
packs that will clean up toxic
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harnessing DNA's coding power
to make blindingly fast

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computers; discovering miracle drugs by observing what animals eat; and much more. The answers are there for the finding, poemlike in their elegance and economy. Anyone interested in the people and

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ideas that are shaping our future
must read this book to know
where the most exciting
revelations lie -- -literally all
around us.

This book of conference
proceedings contains papers

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presented at the Art and Design International Conference (AnDIC 2016). It examines the impact of Cyberology, also known as Internet Science, on the world of art and design. It looks at how the rapid growth of Cyberology

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and the creation of various applications and devices have influenced human relationships. The book discusses the impact of Cyberology on the behaviour, attitudes and perceptions of users, including the way they

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work and communicate. With a strong focus on how the Cyberology world influences and changes the methods and works of artists, this book features topics that are relevant to four key players - artists,

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intermediaries, policy makers, and the audience - in a cultural system, especially in the world of art and design. It examines the development, problems and issues of traditional cultural values, identity and new trends

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in contemporary art. Most importantly, the book attempts to discuss the past, present and future of art and design whilst looking at some underlying issues that need to be addressed collectively.

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When searching for genuinely sustainable building design and technology - designs that go beyond conventional sustainability to be truly restorative - we often find that nature got there first. Over 3.5

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billion years of natural history have evolved innumerable examples of forms, systems, and processes that can be applied to modern green design. For architects, urban designers and product designers, this new

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edition of Biomimicry in
Architecture looks to the natural
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and expanded chapters on structures, materials, waste, water, thermal control and energy, as well as an all-new chapter on light. An amazing sourcebook of extraordinary design solutions, Biomimicry in

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projects. It covers practical case studies to demonstrate the implementation of emerging technologies in a compact style, ensuring that practitioners can adopt these methods to realize immediate benefits in

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productivity, safety and
performance improvement.

A Seed Bank of Best Practices

How the World's Leading

Companies Are Doing Well by

Doing Good

Resilient Investment Strategies

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Through Biomimicry
First Workshop on Bio-Inspired
Design of Networks, BLOWIRE
2007 Cambridge, UK, April 2-5,
2007, Revised Papers
Biologically Inspired
Technologies

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Biomimicry and Business

Biomimicry

Step Out of Your Car and Right into Nature! New England's Roadside Ecology guides you through 30 spectacular natural sites, all within an easy walk from the road. The sites include the forests,

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wetlands, alpines, dunes, and geologic ecosystems that make up New England. Author Tom Wessels is the perfect guide. Each entry starts with the brief description of the hike's level of difficulty—all are gentle to moderate and cover no more than two miles. Entries also include turn-by-turn directions and clear descriptions of

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the flora, fauna, and fungi you are likely to encounter along the way. New England's Roadside Ecology is a must-have guide for outdoor enthusiasts, hikers, and tourists in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Despite the vital importance of the emerging area of biotechnology and its

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role in defense planning and policymaking, no definitive book has been written on the topic for the defense policymaker, the military student, and the private-sector bioscientist interested in the "emerging opportunities market" of national security. This edited volume is intended to help close this gap and provide

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the necessary backdrop for thinking strategically about biology in defense planning and policymaking. This volume is about applications of the biological sciences, here called "biologically inspired innovations," to the military. Rather than treating biology as a series of threats to be dealt with, such innovations generally

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approach the biological sciences as a set of opportunities for the military to gain strategic advantage over adversaries.

These opportunities range from looking at everything from genes to brains, from enhancing human performance to creating renewable energy, from sensing the environment around us to harnessing its

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power.

The book constitutes the thoroughly refereed post-workshop proceedings of the First Workshop on Bio-Inspired Design of Networks, BIOWIRE 2007, held in Cambridge, UK, in April 2007. The 35 revised full papers presented were carefully reviewed and selected from

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many high quality submissions. All recent developments in the field of bio-inspired design of networks are addressed, with particular regard to wireless networks and the self-organizing properties of biological networks. The papers are organized in topical sections on biological networks, network epidemics, complex networks, bio-

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inspired network mode, network protocol in wireless communication, data management, distributed computing, and security.

From simple cases such as hook and latch attachments found in Velcro to articulated-wing flying vehicles, biology often has been used to inspire many creative design

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ideas. The scientific challenge now is to transform the paradigm into a repeatable and scalable methodology. Biologically Inspired Design explores computational techniques and tools that can help integrate the method into design practice. With an inspiring foreword from Janine Benyus, Biologically Inspired Design

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contains a dozen chapters written by some of the leading scholars in the transdisciplinary field of bioinspired design, such as Frank Fish, Julian Vincent and Jeannette Yen from biology, and Amarek Chakrabarti, Satyandra Gupta and Li Shu from engineering. Based in part on discussions at two workshops

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sponsored by the United States National Science Foundation, this volume introduces and develops several methods and tools for bioinspired design including: Information-processing theories, Natural language techniques, Knowledge-based tools, and Functional approaches and Pedagogical techniques. By exploring

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these fundamental theories, techniques and tools for supporting biologically inspired design, this volume provides a comprehensive resource for design practitioners wishing to explore the paradigm, an invaluable guide to design educators interested in teaching the method, and a preliminary reading for

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design researchers wanting to investigate
bioinspired design.

Architecture Follows Nature-Biomimetic
Principles for Innovative Design

Biomimetics for Architecture

Design Is The Problem

The Fourth Industrial Revolution

Product and Process Design

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Applying Properties of Animals
Skins to Inspire Architectural
Envelopes Biology influences
design projects in many ways;
the related discipline is known as
biomimetics or biomimicry. Using
the animal kingdom as a source

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of inspiration, Ilaria Mazzoleni seeks to instill a shift in thinking about the application of biological principles to design and architecture. She focuses on the analysis of how organisms have adapted to different

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environments and translates the learned principles into the built environment. To illustrate the methodology, Mazzoleni draws inspiration from the diversity of animal coverings, referred to broadly as skin, and applies

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them to the design of building envelopes through a series of twelve case studies. Skin is a complex organ that performs a multitude of functions; namely, it serves as a link between the body and the environment.

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Similarly, building envelopes act as interfaces between their inhabitants and external elements. The resulting architectural designs illustrate an integrative methodology that allows architecture to follow

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nature. "Ilaria Mazzoleni, in collaboration with biologist Shauna Price, has developed a profound methodology for architectural and design incentives that anticipates and proposes novel ways to explore

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undiscovered biological inspirations for various audiences." —Yoseph Bar-Cohen

As the existence of all life forms on our planet is currently in grave danger from the climate

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emergency caused by Homo sapiens, the words "sustainability" and "eco-responsibility" have entered the daily-use vocabularies of scientists, engineers, economists, business managers,

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industrialists, capitalists, and policy makers. Normal activities undertaken for the design of products and systems in industrialisms must be revamped. As the bioworld is a great resource for eco-

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responsible design activities, an overview of biologically inspired design is presented in this book in simple terms for anyone with even high-school education.

Beginning with an introduction to the process of design in industry,

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the book presents the bioworld as a design resource along with the rationale for biologically inspired design. Problem-driven and solution-driven approaches for biologically inspired design are described next. The last

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chapter is focused on biologically inspired design for environment.