

## *Metadata The MIT Press Essential Knowledge Series*

*The Book The Art of Failure Teaching Computational Thinking Biofabrication Living Books Management Annotation The Future Garage Data Science Algorithms Bicycling Science, fourth edition Innovating Active Matter How Images Think Tap Deep Learning Social Science for What? Buy Now Interconnecting the Network of Networks Mind and Hand C# Precisely Balancing Green Echo The Constitution of Algorithms Standards Proxies Content Engineering a Safer World At Your Service Problems of Atomic Dynamics Technology and Privacy Reassembling Scholarly Communications Technology and the Dream Free Innovation After Access Data Feminism Paradox Ada and the Galaxies Built on Sand*

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*It is your unconditionally own period to play a role reviewing habit. in the middle of guides you could enjoy now is Metadata The MIT Press Essential Knowledge Series below.*

*Algorithms Dec 23 2021 In the tradition of Real World Algorithms: A Beginner's Guide, Panos Louridas is back to introduce algorithms in an accessible manner, utilizing various examples to explain not just what algorithms are but how they work. Digital technology runs on algorithms, sets of instructions that describe how to do something efficiently. Application areas range from search engines to tournament scheduling, DNA sequencing, and machine learning. Arguing that every educated person today needs to have some understanding of algorithms and what they do, in this volume in the MIT Press Essential Knowledge series, Panos Louridas offers an introduction to algorithms that is accessible to the nonspecialist reader. Louridas explains not just what algorithms are but also how they work, offering a wide range of examples and keeping mathematics to a minimum.*

*Proxies Aug 07 2020 How those with the power to design technology, in the very moment of design, are allowed to imagine who is included--and who is excluded--in the future. Our world is built on an array of standards we are compelled to share. In Proxies, Dylan Mulvin examines how we arrive at those standards, asking, "To whom and to what do we delegate the power to stand in for the world?" Mulvin shows how those with the power to design technology, in the very moment of design, are allowed to imagine who is included--and who is excluded--in the future. For designers of technology, some bits of the world end up standing in for other bits, standards with which they build and calibrate. These "proxies" carry specific values, even as they disappear from view. Mulvin explores the ways technologies, standards, and infrastructures inescapably reflect the cultural milieus of their bureaucratic homes. Drawing on archival research, he investigates some of the basic building-blocks of our shared infrastructures. He tells the history of technology through the labor and communal practices of, among others, the people who clean kilograms to make the metric system run, the women who pose as test images, and the actors who embody disease and disability for medical students. Each case maps the ways standards and infrastructure rely on prototypical ideas of whiteness, able-bodiedness, and purity to control and contain the messiness of reality. Standards*

*and infrastructures, Mulvin argues, shape and distort the possibilities of representation, the meaning of difference, and the levers of change and social justice.*

*Ada and the Galaxies Jul 26 2019 Stargazers rejoice! In his first book for children, renowned physicist Alan Lightman and collaborators, with help from the Hubble telescope, light up the night sky. New York Times best-selling author Alan Lightman, in collaboration with Olga Pastuchiv, brings galaxies close in a stunning picture-book tribute to the interconnectedness of the natural world. Layering photographs taken from the Hubble telescope into charming and expressive art, illustrator Susanna Chapman zooms in on one child's experiences: Ada knows that the best place for star-gazing is on the island in Maine where she vacations with her grandparents. By day, she tracks osprey in the trees, paddles a kayak, and hunts for shells. But she's most in her element when the sun goes down and the stars blink to life. Will the fog this year foil her plans, or will her grandfather find a way to shine a spotlight on the vast puzzle of the universe . . . until the weather turns?*

*After Access Oct 28 2019 An expert considers the effects of a more mobile Internet on socioeconomic development and digital inclusion, examining both potentialities and constraints. Almost anyone with a \$40 mobile phone and a nearby cell tower can get online with an ease unimaginable just twenty years ago. An optimistic narrative has proclaimed the mobile phone as the device that will finally close the digital divide. Yet access and effective use are not the same thing, and the digital world does not run on mobile handsets alone. In After Access, Jonathan Donner examines the implications of the shift to a more mobile, more available Internet for the global South, particularly as it relates to efforts to promote socioeconomic development and broad-based inclusion in the global information society. Drawing on his own research in South Africa and India, as well as the burgeoning literature from the ICT4D (Internet and Communication Technologies for Development) and mobile communication communities, Donner introduces the "After Access Lens," a conceptual framework for understanding effective use of the Internet by those whose "digital repertoires" contain exclusively mobile devices. Donner argues that both the potentialities and constraints of the shift to a more mobile Internet are important considerations for scholars and practitioners interested in Internet use in the global South.*

*Standards Sep 07 2020 An investigation into standards, the invisible infrastructures of our technical, moral, social, and physical worlds. Standards are the means by which we construct realities. There are established standards for professional accreditation, the environment, consumer products, animal welfare, the acceptable stress for highway bridges, healthcare, education—for almost everything. We are surrounded by a vast array of standards, many of which we take for granted but each of which has been and continues to be the subject of intense negotiation. In this book, Lawrence Busch investigates standards as "recipes for reality." Standards, he argues, shape not only the physical world around us but also our social lives and even our selves. Busch shows how standards are intimately connected to power—that they often serve to empower some and disempower others. He outlines the history of formal standards and describes how modern science came to be associated with the moral-technical project of standardization of both people and things. Busch suggests guidelines for developing fair, equitable, and effective standards. Taking a uniquely integrated and comprehensive view of the subject, Busch shows how standards for people and things are inextricably linked, how standards are always layered (even if often addressed serially), and how standards are simultaneously technical, social, moral, legal, and ontological devices.*

*Social Science for What? May 16 2021 How the NSF became an important yet controversial patron for the social sciences, influencing debates over their scientific status and social relevance. In the early Cold War years, the U.S. government established the National Science Foundation (NSF), a civilian agency that soon became widely known for its dedication to supporting first-rate science. The agency's 1950 enabling legislation made no mention of the social sciences, although it included a vague reference to "other sciences." Nevertheless, as Mark Solovey shows in this book, the NSF also soon became a major—albeit*

*controversial—source of public funding for them. Solovey's analysis underscores the long-term impact of early developments, when the NSF embraced a "scientific" strategy wherein the natural sciences represented the gold standard, and created a social science program limited to "hard-core" studies. Along the way, Solovey shows how the NSF's efforts to support scholarship, advanced training, and educational programs were shaped by landmark scientific and political developments, including McCarthyism, Sputnik, reform liberalism during the 1960s, and a newly energized conservative movement during the 1970s and 1980s. Finally, he assesses the NSF's relevance in a "post-truth" era, questions the legacy of its scientific strategy, and calls for a separate social science agency—a National Social Science Foundation. Solovey's study of the battles over public funding is crucial for understanding the recent history of the social sciences as well as ongoing debates over their scientific status and social value.*

*Annotation Apr 26 2022 An introduction to annotation as a genre--a synthesis of reading, thinking, writing, and communication--and its significance in scholarship and everyday life. Annotation--the addition of a note to a text--is an everyday and social activity that provides information, shares commentary, sparks conversation, expresses power, and aids learning. It helps mediate the relationship between reading and writing. This volume in the MIT Press Essential Knowledge series offers an introduction to annotation and its literary, scholarly, civic, and everyday significance across historical and contemporary contexts. It approaches annotation as a genre--a synthesis of reading, thinking, writing, and communication--and offer examples of annotation that range from medieval rubrication and early book culture to data labeling and online reviews.*

*Balancing Green Dec 11 2020 An expert on business strategy offers a pragmatic take on how businesses of all sizes balance the competing demands of profitability and employment with sustainability. The demands and stresses on companies only grow as executives face a multitude of competing business goals. Their stakeholders are interested in corporate profits, jobs, business growth, and environmental sustainability. In this book, business strategy expert Yossi Sheffi offers a pragmatic take on how businesses of all sizes—from Coca Cola and Siemens to Dr. Bronner's Magical Soaps and Patagonia—navigate these competing goals. Drawing on extensive interviews with more than 250 executives, Sheffi examines the challenges, solutions, and implications of balancing traditional business goals with sustainability. Sheffi, author of the widely read *The Resilient Enterprise*, argues that business executives' personal opinions on environmental sustainability are irrelevant. The business merits of environmental sustainability are based on the fact that even the most ardent climate change skeptics in the C-suite face natural resource costs, public relations problems, regulatory burdens, and a green consumer segment. Sheffi presents three basic business rationales for corporate sustainability efforts: cutting costs, reducing risk, and achieving growth. For companies, sustainability is not a simple case of "profits versus planet" but is instead a more subtle issue of (some) people versus (other) people—those looking for jobs and inexpensive goods versus others who seek a pristine environment. This book aims to help companies satisfy these conflicting motivations for both economic growth and environmental sustainability.*

*Interconnecting the Network of Networks Mar 14 2021 This book describes the transformation of telecommunications from national network monopolies to a new system, the "network of networks," and the glue that holds it together, interconnection. By their very nature, monopoly-owned networks provided a small number of standardized, nationwide services. Over the past two decades, however, new forces in the world economy began to unravel this traditional system. The driving force behind the change was the shift toward an information-based economy. Especially for large organizations, the price, control, security, and reliability of telecommunications became variables requiring organized attention. Thus, monopoly began to give way to the "network of networks," the foundation of today's telecommunications and Internet infrastructure. Taking a broad, multidisciplinary perspective Eli Noam discusses the importance and history of interconnection policy, as well as recent policy reforms both within the United States and around the*

globe. Other important topics he discusses include interconnection prices, the unbundling of interconnection, and the technology of interconnection. He concludes with an examination of social and policy issues, including the free flow of content, universal service and privacy protection, and the future of telecommunications.

*Mind and Hand* Feb 10 2021 The intellectual heritage of MIT: an account of "the flow of ideas" about science and education that shaped the Institute as it emerged and that inspires it today. The motto on the seal of the Massachusetts Institute of Technology, "Mens et Manus" -- "mind and hand" -- signals the Institute's dedication to what MIT founder William Barton Rogers called "the most earnest cooperation of intelligent culture with industrial pursuits." *Mind and Hand* traces the ideas about science and education that have shaped MIT and defined its mission -- from the new science of the Enlightenment era and the ideals of representative democracy spurred by the Industrial Revolution to new theories on the nature and role of higher education in nineteenth-century America. MIT emerged in mid-century as an experiment in scientific and technical education, with its origins in the tension between these old and new ideas. *Mind and Hand* was undertaken by Julius Stratton after his retirement from the presidency of MIT and continued by Loretta Mannix after his death; Philip N. Alexander, of the MIT Program in Writing and Humanistic Studies, stepped in to complete the project. The combined efforts of these three authors have given us what Julius Stratton envisioned -- "a coherent account of the flow of ideas" from which MIT emerged.

*The Constitution of Algorithms* Oct 09 2020 A laboratory study that investigates how algorithms come into existence. Algorithms--often associated with the terms big data, machine learning, or artificial intelligence--underlie the technologies we use every day, and disputes over the consequences, actual or potential, of new algorithms arise regularly. In this book, Florian Jaton offers a new way to study computerized methods, providing an account of where algorithms come from and how they are constituted, investigating the practical activities by which algorithms are progressively assembled rather than what they may suggest or require once they are assembled.

Free Innovation Nov 29 2019 A leading innovation scholar explains the growing phenomenon and impact of free innovation, in which innovations developed by consumers and given away "for free." In this book, Eric von Hippel, author of the influential *Democratizing Innovation*, integrates new theory and research findings into the framework of a "free innovation paradigm." Free innovation, as he defines it, involves innovations developed by consumers who are self-rewarded for their efforts, and who give their designs away "for free." It is an inherently simple grassroots innovation process, unencumbered by compensated transactions and intellectual property rights. Free innovation is already widespread in national economies and is steadily increasing in both scale and scope. Today, tens of millions of consumers are collectively spending tens of billions of dollars annually on innovation development. However, because free innovations are developed during consumers' unpaid, discretionary time and are given away rather than sold, their collective impact and value have until very recently been hidden from view. This has caused researchers, governments, and firms to focus too much on the Schumpeterian idea of innovation as a producer-dominated activity. Free innovation has both advantages and drawbacks. Because free innovators are self-rewarded by such factors as personal utility, learning, and fun, they often pioneer new areas before producers see commercial potential. At the same time, because they give away their innovations, free innovators generally have very little incentive to invest in diffusing what they create, which reduces the social value of their efforts. The best solution, von Hippel and his colleagues argue, is a division of labor between free innovators and producers, enabling each to do what they do best. The result will be both increased producer profits and increased social welfare—a gain for all.

*How Images Think* Aug 19 2021 Examines the redefinition of the interactive relationship that humans have with image-based technologies that have so much intelligence programmed into them and how virtual images blur the distinction between subject and object.

*C# Precisely* Jan 12 2021 A concise reference to the C# programming language; one of the first books to cover C# version 2.0. C# is an object-oriented programming language that is similar to the Java programming language in many respects but more comprehensive and different in most details. This book gives a concise description of C#. It is intended as a guide for readers who know Java and want to learn C# and as a quick reference for anyone who wants to know C# in more detail than that provided by a standard textbook. The final chapter of *C# Precisely* summarizes the differences between C# and Java. *C# Precisely* is one of the first books on C# to cover version 2.0. It presents the entire C# 2.0 programming language, including generics, iterators, and anonymous methods. It excludes most of the extensive Microsoft.NET framework class libraries except threads, input/output, and generic collection classes. The book shows general rules on left-hand pages, with corresponding examples on right-hand pages. All examples are fragments of legal C# programs. The complete, ready-to-run example programs are available at the book's Web site.

*Data Science* Jan 24 2022 A concise introduction to the emerging field of data science, explaining its evolution, relation to machine learning, current uses, data infrastructure issues, and ethical challenges. The goal of data science is to improve decision making through the analysis of data. Today data science determines the ads we see online, the books and movies that are recommended to us online, which emails are filtered into our spam folders, and even how much we pay for health insurance. This volume in the MIT Press Essential Knowledge series offers a concise introduction to the emerging field of data science, explaining its evolution, current uses, data infrastructure issues, and ethical challenges. It has never been easier for organizations to gather, store, and process data. Use of data science is driven by the rise of big data and social media, the development of high-performance computing, and the emergence of such powerful methods for data analysis and modeling as deep learning. Data science encompasses a set of principles, problem definitions, algorithms, and processes for extracting non-obvious and useful patterns from large datasets. It is closely related to the fields of data mining and machine learning, but broader in scope. This book offers a brief history of the field, introduces fundamental data concepts, and describes the stages in a data science project. It considers data infrastructure and the challenges posed by integrating data from multiple sources, introduces the basics of machine learning, and discusses how to link machine learning expertise with real-world problems. The book also reviews ethical and legal issues, developments in data regulation, and computational approaches to preserving privacy. Finally, it considers the future impact of data science and offers principles for success in data science projects.

*Technology and the Dream* Dec 31 2019 Transcripts of more than seventy-five oral history interviews in which the interviewees assess their MIT experience and reflect on the role of blacks at MIT and beyond. This book grew out of the Blacks at MIT History Project, whose mission is to document the black presence at MIT. The main body of the text consists of transcripts of more than seventy-five oral history interviews, in which the interviewees assess their MIT experience and reflect on the role of blacks at MIT and beyond. Although most of the interviewees are present or former students, black faculty, administrators, and staff are also represented, as are nonblack faculty and administrators who have had an impact on blacks at MIT. The interviewees were selected with an eye to presenting the broadest range of issues and personalities, as well as a representative cross section by time period and category. Each interviewee was asked to discuss family background; education; role models and mentors; experiences of racism and race-related issues; choice of field and career; goals; adjustment to the MIT environment; best and worst MIT experiences; experience with MIT support services; relationships with MIT students, faculty, and staff; advice to present or potential MIT students; and advice to the MIT administration. A recurrent theme is that MIT's rigorous teaching instills the confidence to deal with just about any hurdle in professional life, and that an MIT degree opens many doors and supplies instant credibility. Each interview includes biographical notes and pictures. The book also includes a general introduction, a glossary, and appendixes describing the project's

methodology.

*Garage* Feb 22 2022 A secret history of the garage as a space of creativity, from its invention by Frank Lloyd Wright to its use by start-ups and garage bands. Frank Lloyd Wright invented the garage when he moved the automobile out of the stable into a room of its own. Steve Jobs and Steve Wozniak (allegedly) started Apple Computer in a garage. Suburban men turned garages into man caves to escape from family life. Nirvana and No Doubt played their first chords as garage bands. What began as an architectural construct became a cultural construct. In this provocative history and deconstruction of an American icon, Olivia Erlanger and Luis Ortega Goveia use the garage as a lens through which to view the advent of suburbia, the myth of the perfect family, and the degradation of the American dream. The stories of what happened in these garages became self-fulfilling prophecies the more they were repeated. Hewlett-Packard was founded in a garage that now bears a plaque: The Birthplace of Silicon Valley. Google followed suit, dreamed up in a Menlo Park garage a few decades later. Also conceived in a garage: the toy company Mattel, creator of Barbie, the postwar, posthuman representation of American women. Garages became guest rooms, game rooms, home gyms, wine cellars, and secret bondage lairs, a no-commute destination for makers and DIYers—surfboard designers, ski makers, pet keepers, flannel-wearing musicians, weed-growing nuns. The garage was an aboveground underground, offering both a safe space for withdrawal and a stage for participation—opportunities for isolation or empowerment.

*Paradox* Aug 26 2019 An introduction to paradoxes showing that they are more than mere puzzles but can prompt new ways of thinking. Thinkers have been fascinated by paradox since long before Aristotle grappled with Zeno's. In this volume in The MIT Press Essential Knowledge series, Margaret Cuonzo explores paradoxes and the strategies used to solve them. She finds that paradoxes are more than mere puzzles but can prompt new ways of thinking. A paradox can be defined as a set of mutually inconsistent claims, each of which seems true. Paradoxes emerge not just in salons and ivory towers but in everyday life. (An Internet search for “paradox” brings forth a picture of an ashtray with a “no smoking” symbol inscribed on it.) Proposing solutions, Cuonzo writes, is a natural response to paradoxes. She invites us to rethink paradoxes by focusing on strategies for solving them, arguing that there is much to be learned from this, regardless of whether any of the more powerful paradoxes is even capable of solution. Cuonzo offers a catalog of paradox-solving strategies—including the Preemptive-Strike (questioning the paradox itself), the Odd-Guy-Out (calling one of the assumptions into question), and the You-Can't-Get-There-from-Here (denying the validity of the reasoning). She argues that certain types of solutions work better in some contexts than others, and that as paradoxicality increases, the success of certain strategies grows more unlikely. Cuonzo shows that the processes of paradox generation and solution proposal are interesting and important ones. Discovering a paradox leads to advances in knowledge: new science often stems from attempts to solve paradoxes, and the concepts used in the new sciences lead to new paradoxes. As Niels Bohr wrote, “How wonderful that we have met with a paradox. Now we have some hope of making progress.”

*The Future* Mar 26 2022 How the future has been imagined and made, through the work of writers, artists, inventors, and designers. The future is like an unwritten book. It is not something we see in a crystal ball, or can only hope to predict, like the weather. In this volume of the MIT Press's Essential Knowledge series, Nick Montfort argues that the future is something to be made, not predicted. Montfort offers what he considers essential knowledge about the future, as seen in the work of writers, artists, inventors, and designers (mainly in Western culture) who developed and described the core components of the futures they envisioned. Montfort's approach is not that of futurology or scenario planning; instead, he reports on the work of making the future—the thinkers who devoted themselves to writing pages in the unwritten book. Douglas Engelbart, Alan Kay, and Ted Nelson didn't predict the future of computing, for instance. They were three of the people who made it. Montfort focuses on how the development of technologies—with an emphasis on digital technologies—has been bound up with ideas about the future. Readers learn about kitchens of the

*future and the vision behind them; literary utopias, from Plato's Republic to Edward Bellamy's Looking Backward and Charlotte Perkins Gilman's Herland; the Futurama exhibit at the 1939 New York World's Fair; and what led up to Tim Berners-Lee's invention of the World Wide Web. Montfort describes the notebook computer as a human-centered alternative to the idea of the computer as a room-sized "giant brain"; speculative practice in design and science fiction; and, throughout, the best ways to imagine and build the future.*

*Buy Now Apr 14 2021 How Amazon combined branding and relationship marketing with massive distribution infrastructure to become the ultimate service brand in the digital economy. Amazon is ubiquitous in our daily lives—we stream movies and television on Amazon Prime Video, converse with Alexa, receive messages on our smartphone about the progress of our latest orders. In Buy Now, Emily West examines Amazon's consumer-facing services to investigate how Amazon as a brand grew so quickly and inserted itself into so many aspects of our lives even as it faded into the background, becoming a sort of infrastructure that can be taken for granted. Amazon promotes the comfort and care of its customers (but not its workers) to become the ultimate service brand in the digital economy. West shows how Amazon has cultivated personalized, intimate relationships with consumers that normalize its outsized influence on our selves and our communities. She describes the brand's focus on speedy and seamless ecommerce delivery, represented in the materiality of the branded brown box; the positioning of its book retailing, media streaming, and smart speakers as services rather than sales; and the brand's image control strategies. West considers why pushback against Amazon's ubiquity and market power has come mainly from among Amazon's workers rather than its customers or competitors, arguing that Amazon's brand logic fragments consumers as a political bloc. West's innovative account, the first to examine Amazon from a critical media studies perspective, offers a cautionary cultural study of bigness in today's economy.*

*Technology and Privacy Mar 02 2020 Over the last several years, the realm of technology and privacy has been transformed, creating a landscape that is both dangerous and encouraging. Significant changes include large increases in communications bandwidths; the widespread adoption of computer networking and public-key cryptography; new digital media that support a wide range of social relationships; a massive body of practical experience in the development and application of data-protection laws; and the rapid globalization of manufacturing, culture, and policy making. The essays in this book provide a new conceptual framework for the analysis and debate of privacy policy and for the design and development of information systems.*

*Engineering a Safer World Jun 04 2020 A new approach to safety, based on systems thinking, that is more effective, less costly, and easier to use than current techniques. Engineering has experienced a technological revolution, but the basic engineering techniques applied in safety and reliability engineering, created in a simpler, analog world, have changed very little over the years. In this groundbreaking book, Nancy Leveson proposes a new approach to safety—more suited to today's complex, sociotechnical, software-intensive world—based on modern systems thinking and systems theory. Revisiting and updating ideas pioneered by 1950s aerospace engineers in their System Safety concept, and testing her new model extensively on real-world examples, Leveson has created a new approach to safety that is more effective, less expensive, and easier to use than current techniques. Arguing that traditional models of causality are inadequate, Leveson presents a new, extended model of causation (Systems-Theoretic Accident Model and Processes, or STAMP), then shows how the new model can be used to create techniques for system safety engineering, including accident analysis, hazard analysis, system design, safety in operations, and management of safety-critical systems. She applies the new techniques to real-world events including the friendly-fire loss of a U.S. Blackhawk helicopter in the first Gulf War; the Vioxx recall; the U.S. Navy SUBSAFE program; and the bacterial contamination of a public water supply in a Canadian town. Leveson's approach is relevant even beyond safety engineering, offering techniques for "reengineering" any large sociotechnical system to improve safety and manage risk.*

*At Your Service* May 04 2020 Research results from industry-academic collaborative projects in service-oriented computing describe practical, achievable solutions. Service-Oriented Applications and Architectures (SOAs) have captured the interest of industry as a way to support business-to-business interaction, and the SOA market grew by \$4.9 billion in 2005. SOAs and in particular service-oriented computing (SOC) represent a promising approach in the development of adaptive distributed systems. With SOC, applications can open themselves to services offered by third parties and accessed through standard, well-defined interfaces. The binding between the applications and the services can be, in this context, extremely loose--enabling the ad hoc creation of new services when the need arises. This book offers an overview of some current research in the field, presenting the results of eighteen research projects funded by the European Community's Information Society Technologies Program (IST). The projects, collaborations between industry and academia, have produced practical, achievable results that point the way to real-world applications and future research. The chapters address such issues as requirement analysis, design, governance, interoperability, and the dependability of systems made up of components owned by third parties. The results are presented in the context of two roadmaps for research, one developed by European industry involved in software development and the other by researchers working in the service area. The contributors report first on the "Infrastructure Layer," then (in the bulk of the book) on the "Service Integration Layer," the "Semantic Layer," and finally on the issues that cut across the different layers. The book concludes by looking at ongoing research on both roadmaps.

*Reassembling Scholarly Communications* Jan 30 2020 A range of perspectives on the complex political, philosophical, and pragmatic implications of opening research and scholarship through digital technologies. The Open Access Movement proposes to remove price and permission barriers for accessing peer-reviewed research work--to use the power of the internet to duplicate material at an infinitesimal cost-per-copy. In this volume, contributors show that open access does not exist in a technological vacuum; there are complex political, philosophical, and pragmatic implications for opening research through digital technologies. The contributors examine open access across spans of colonial legacies, knowledge frameworks, publics and politics, archives and digital preservation, infrastructures and platforms, and global communities.

*The Art of Failure* Oct 01 2022 An exploration of why we play video games despite the fact that we are almost certain to feel unhappy when we fail at them. We may think of video games as being "fun," but in *The Art of Failure*, Jesper Juul claims that this is almost entirely mistaken. When we play video games, our facial expressions are rarely those of happiness or bliss. Instead, we frown, grimace, and shout in frustration as we lose, or die, or fail to advance to the next level. Humans may have a fundamental desire to succeed and feel competent, but game players choose to engage in an activity in which they are nearly certain to fail and feel incompetent. So why do we play video games even though they make us unhappy? Juul examines this paradox. In video games, as in tragic works of art, literature, theater, and cinema, it seems that we want to experience unpleasantness even if we also dislike it. Reader or audience reaction to tragedy is often explained as catharsis, as a purging of negative emotions. But, Juul points out, this doesn't seem to be the case for video game players. Games do not purge us of unpleasant emotions; they produce them in the first place. What, then, does failure in video game playing do? Juul argues that failure in a game is unique in that when you fail in a game, you (not a character) are in some way inadequate. Yet games also motivate us to play more, in order to escape that inadequacy, and the feeling of escaping failure (often by improving skills) is a central enjoyment of games. Games, writes Juul, are the art of failure: the singular art form that sets us up for failure and allows us to experience it and experiment with it. *The Art of Failure* is essential reading for anyone interested in video games, whether as entertainment, art, or education.

*Data Feminism* Sep 27 2019 A new way of thinking about data science and data ethics that is informed by the ideas of intersectional feminism. Today, data science is a form of power. It has been used to expose

*injustice, improve health outcomes, and topple governments. But it has also been used to discriminate, police, and surveil. This potential for good, on the one hand, and harm, on the other, makes it essential to ask: Data science by whom? Data science for whom? Data science with whose interests in mind? The narratives around big data and data science are overwhelmingly white, male, and techno-heroic. In Data Feminism, Catherine D'Ignazio and Lauren Klein present a new way of thinking about data science and data ethics—one that is informed by intersectional feminist thought. Illustrating data feminism in action, D'Ignazio and Klein show how challenges to the male/female binary can help challenge other hierarchical (and empirically wrong) classification systems. They explain how, for example, an understanding of emotion can expand our ideas about effective data visualization, and how the concept of invisible labor can expose the significant human efforts required by our automated systems. And they show why the data never, ever “speak for themselves.” Data Feminism offers strategies for data scientists seeking to learn how feminism can help them work toward justice, and for feminists who want to focus their efforts on the growing field of data science. But Data Feminism is about much more than gender. It is about power, about who has it and who doesn't, and about how those differentials of power can be challenged and changed.*

*Bicycling Science, fourth edition Nov 21 2021 An updated edition of a classic: an indispensable companion for a new era in cycling. The bicycle is almost unique among human-powered machines in that it uses human muscles in a near-optimum way. This essential volume offers a comprehensive account of the history of bicycles, how human beings propel them, what makes them go faster—and what keeps them from going even faster. Over the years, and through three previous editions, Bicycling Science has become the bible of technical bicycling not only for designers and builders of bicycles but also for cycling enthusiasts. After a brief history of bicycles and bicycling that demolishes many widespread myths, this fourth edition covers recent experiments and research on human-powered transportation, with updated material on cycling achievements, human-powered machines for use on land and in air and water, power-assisted bicycles, and human physiology. The authors have also added new information on aerodynamics, rolling drag, transmission of power from rider to wheels, braking, heat management, steering and stability, power and speed, and other topics. This edition also includes many new references and figures. With racks of bikeshare bikes on city sidewalks, and new restrictions on greenhouse gas-emitting cars, bicycle use will only grow. This book is the indispensable companion for a new era in cycling.*

*Built on Sand Jun 24 2019 Explaining the science contained in a simple assembly of grains—the most abundant form of matter present on Earth. Granular media—composed of vast amounts of grains, consolidated or not—constitute the most abundant form of solid matter on Earth. Granular materials assemble in disordered configurations scientists often liken to a bag of marbles. Made of macroscopic particles rather than molecules, they defy the standard scheme of classification in terms of solid, liquid, and gas. Granular materials provide a model relevant to various domains of research, including engineering, physics, and biology. William Blake famously wished “To See a World in a Grain of Sand”; in this book, pioneering researchers in granular matter explain the science hidden behind simple grains, shedding light on collective behavior in disordered settings in general. The authors begin by describing the single grain with its different origins, shapes, and sizes, then examine grains in piled or stacked form. They explain the packing fraction of granular media, a crucial issue that bears on the properties displayed in practical applications; explore small-scale deformations in piles of disordered grains, with particular attention to friction; and present theories of various modes of disorder. Along the way, they discuss such concepts as force chains, arching effects, wet grains, sticky contacts, and inertial effects. Drawing on recent numerical simulations as well as classical concepts developed in physics and mechanics, the book offers an accessible introduction to a rapidly developing field.*

*Deep Learning Jun 16 2021 An introduction to a broad range of topics in deep learning, covering mathematical and conceptual background, deep learning techniques used in industry, and research*

perspectives. “Written by three experts in the field, *Deep Learning* is the only comprehensive book on the subject.” —Elon Musk, cochair of OpenAI; cofounder and CEO of Tesla and SpaceX *Deep learning is a form of machine learning that enables computers to learn from experience and understand the world in terms of a hierarchy of concepts. Because the computer gathers knowledge from experience, there is no need for a human computer operator to formally specify all the knowledge that the computer needs. The hierarchy of concepts allows the computer to learn complicated concepts by building them out of simpler ones; a graph of these hierarchies would be many layers deep. This book introduces a broad range of topics in deep learning. The text offers mathematical and conceptual background, covering relevant concepts in linear algebra, probability theory and information theory, numerical computation, and machine learning. It describes deep learning techniques used by practitioners in industry, including deep feedforward networks, regularization, optimization algorithms, convolutional networks, sequence modeling, and practical methodology; and it surveys such applications as natural language processing, speech recognition, computer vision, online recommendation systems, bioinformatics, and videogames. Finally, the book offers research perspectives, covering such theoretical topics as linear factor models, autoencoders, representation learning, structured probabilistic models, Monte Carlo methods, the partition function, approximate inference, and deep generative models. Deep Learning can be used by undergraduate or graduate students planning careers in either industry or research, and by software engineers who want to begin using deep learning in their products or platforms. A website offers supplementary material for both readers and instructors.*

*Content Jul 06 2020 A concise introduction to content and the content industry, from the early internet to the Instagram egg. From the time we roll out of bed to check overnight updates to our last posts, likes, and views of the previous day, we're consuming and producing content. But what does the term “content” even mean? When did it become ubiquitous? And at what cost? In this volume in the MIT Press Essential Knowledge series, Kate Eichhorn offers a concise introduction to content and the content industry, examining the far-reaching effects content has on culture, politics, and labor in a digital age. Eichhorn traces the evolution of our current understanding of content from the early internet to the current social mediaverse. The quintessential example of content, she says, is the Instagram egg—an image that imparted no information or knowledge and circulated simply for the sake of circulation. Eichhorn explores what differentiates user-generated content from content produced by compensated (although often undercompensated) workers; examines how fields from art and literature to journalism and politics have weathered the rise of the content industry; and investigates the increasing importance of artists’ “content capital”—the ability of artists, writers, and performers to produce content not about their work but about their status as artists.*

*Biofabrication Jul 30 2022 How engineered materials and machines powered by living biological cells can tackle technological challenges in medicine, agriculture, and global security. You are a biological machine whose movement is powered by skeletal muscle, just as a car is a machine whose movement is powered by an engine. If you can be built from the bottom up with biological materials, other machines can be as well. This is the conceptual starting point for biofabrication, the act of building with living cells—building with biology in the same way we build with synthetic materials. In this volume in the MIT Press Essential Knowledge series, Ritu Raman offers an accessible introduction to biofabrication, arguing that it can address some of our greatest technological challenges. After presenting the background information needed to understand the emergence and evolution of biofabrication and describing the fundamental technology that enables building with biology, Raman takes deep dives into four biofabrication applications that have the potential to affect our daily lives: tissue engineering, organs-on-a-chip, lab-grown meat and leather, and biohybrid machines. Organs-on-a-chip (devices composed of miniature model tissues), for example, could be used to test new medicine and therapies, and lab-grown meat could alleviate environmental damage done by animal farming. She shows that biological materials have abilities synthetic materials do not, including the ability to adapt dynamically to their environments. Exploring the principles of biofabrication, Raman tells*

*us, should help us appreciate the beauty, adaptiveness, and persistence of the biological machinery that drives our bodies and our world.*

*Echo Nov 09 2020 An exploration of echo not as simple repetition but as an agent of creative possibilities. In this volume in the MIT Press Essential Knowledge series, Amit Pinchevski proposes that echo is not simple repetition and the reproduction of sameness but an agent of change and a source of creation and creativity. Pinchevski views echo as a medium, connecting and mediating across and between disparate domains. He reminds us that the mythological Echo, sentenced by Juno to repeat the last words of others, found a way to make repetition expressive. So too does echo introduce variation into sameness, mediating between self and other, inside and outside, known and unknown, near and far. Echo has the potential to bring back something unexpected, either more or less than what was sent. Pinchevski distinguishes echo from the closely related but sometimes conflated reflection, reverberation, and resonance; considers echolalia as an active, reactive, and creative vocalic force, the launching pad of speech; and explores echo as a rhetorical device, steering between appropriation and response while always maintaining relation. He examines the trope of echo chamber and both destructive and constructive echoing; describes various echo techniques and how echo can serve practical purposes from echolocation in bats and submarines to architecture and sound recording; explores echo as a link to the past, both literally and metaphorically; and considers echo as medium using Marshall McLuhan's tetrad.*

*Tap Jul 18 2021 How the smartphone can become a personal concierge (not a stalker) in the mobile marketing revolution of smarter companies, value-seeking consumers, and curated offers. Consumers create a data trail by tapping their phones; businesses can tap into this trail to harness the power of the more than three trillion dollar mobile economy. According to Anindya Ghose, a global authority on the mobile economy, this two-way exchange can benefit both customers and businesses. In Tap, Ghose welcomes us to the mobile economy of smartphones, smarter companies, and value-seeking consumers. Drawing on his extensive research in the United States, Europe, and Asia, and on a variety of real-world examples from companies including Alibaba, China Mobile, Coke, Facebook, SK Telecom, Telefónica, and Travelocity, Ghose describes some intriguingly contradictory consumer behavior: people seek spontaneity, but they are predictable; they find advertising annoying, but they fear missing out; they value their privacy, but they increasingly use personal data as currency. When mobile advertising is done well, Ghose argues, the smartphone plays the role of a personal concierge—a butler, not a stalker. Ghose identifies nine forces that shape consumer behavior, including time, crowdedness, trajectory, and weather, and he examines these how these forces operate, separately and in combination. With Tap, he highlights the true influence mobile wields over shoppers, the behavioral and economic motivations behind that influence, and the lucrative opportunities it represents. In a world of artificial intelligence, augmented and virtual reality, wearable technologies, smart homes, and the Internet of Things, the future of the mobile economy seems limitless.*

*Problems of Atomic Dynamics Apr 02 2020 The Nobel Laureate discusses the foundations of quantum theory in two lectures, one on the structure of the atom, the other on the lattice theory of rigid bodies.*

*The Book Nov 02 2022 The book as object, as content, as idea, as interface. What is the book in a digital age? Is it a physical object containing pages encased in covers? Is it a portable device that gives us access to entire libraries? The codex, the book as bound paper sheets, emerged around 150 CE. It was preceded by clay tablets and papyrus scrolls. Are those books? In this volume in the MIT Press Essential Knowledge series, Amaranth Borsuk considers the history of the book, the future of the book, and the idea of the book. Tracing the interrelationship of form and content in the book's development, she bridges book history, book arts, and electronic literature to expand our definition of an object we thought we knew intimately. Contrary to the many reports of its death (which has been blamed at various times on newspapers, television, and e-readers), the book is alive. Despite nostalgic paeans to the codex and its printed pages, Borsuk reminds us, the term "book" commonly refers to both medium and content. And the medium has proved to be malleable.*

*Rather than pinning our notion of the book to a single form, Borsuk argues, we should remember its long history of transformation. Considering the book as object, content, idea, and interface, she shows that the physical form of the book has always been the site of experimentation and play. Rather than creating a false dichotomy between print and digital media, we should appreciate their continuities.*

*Innovating Oct 21 2021 Innovating is for doers: you don't need to wait for an earth-shattering idea, but can build one with a hunch and scale it up to impact. Innovation is the subject of countless books and courses, but there's very little out there about how you actually innovate. Innovation and entrepreneurship are not one and the same, although aspiring innovators often think of them that way. They are told to get an idea and a team and to build a show-and-tell for potential investors. In *Innovating*, Luis Perez-Breva describes another approach—a doer's approach developed over a decade at MIT and internationally in workshops, classes, and companies. He shows that to start innovating it doesn't require an earth-shattering idea; all it takes is a hunch. Anyone can do it. By prototyping a problem and learning by being wrong, innovating can be scaled up to make an impact. As Perez-Breva demonstrates, "no thing is new" at the outset of what we only later celebrate as innovation. In *Innovating*, the process—illustrated by unique and dynamic artwork—is shown to be empirical, experimental, nonlinear, and incremental. You give your hunch the structure of a problem. Anything can be a part. Your innovating accrues other people's knowledge and skills. Perez-Breva describes how to create a kit for innovating, and outlines questions that will help you think in new ways. Finally, he shows how to systematize what you've learned: to advocate, communicate, scale up, manage innovating continuously, and document—"you need a notebook to converse with yourself," he advises. Everyone interested in innovating also needs to read this book.*

*Living Books Jun 28 2022 Reimagining the scholarly book as living and collaborative--not as commodified and essentialized, but in all its dynamic materiality. In this book, Janneke Adema proposes that we reimagine the scholarly book as a living and collaborative project--not as linear, bound, and fixed, but as fluid, remixed, and liquid, a space for experimentation. She presents a series of cutting-edge experiments in arts and humanities book publishing, showcasing the radical new forms that book-based scholarly work might take in the digital age. Adema's proposed alternative futures for the scholarly book go beyond such print-based assumptions as fixity, stability, the single author, originality, and copyright, reaching instead for a dynamic and emergent materiality. Adema suggests ways to unbind the book, describing experiments in scholarly book publishing with new forms of anonymous collaborative authorship, radical open access publishing, and processual, living, and remixed publications, among other practices. She doesn't cast digital as the solution and print as the problem; the problem in scholarly publishing, she argues, is not print itself, but the way print has been commodified and essentialized. Adema explores alternative, more ethical models of authorship; constructs an alternative genealogy of openness; and examines opportunities for intervention in current cultures of knowledge production. Finally, asking why it is that we cut and bind our research together at all, she examines two book publishing projects that experiment with remix and reuse and try to rethink and reperform the book-apparatus by taking responsibility for the cuts they make.*

*Management May 28 2022 The MIT Sloan School of Management, as conceived by the legendary General Motors chairman Alfred P. Sloan, was founded in 1952 to draw on the scientific and technical resources of MIT and approach the problems of management with the rigorous research practices for which MIT was famous. Fifty years later, the Sloan School gathered international leaders in business and management, MIT faculty, students, and alumni to address again the basic principles that should guide business and management. This book presents the papers prepared by student-faculty teams, speeches by business and world leaders, and summaries of the discussions from this special convocation; taken together, they offer a guide to the future of management based on the hallmarks of MIT and Sloan—creativity and innovation. The topics considered coalesced around three main themes. First, and paramount, is the necessity of building and maintaining trust by means of openness, transparency, and accountability; this was addressed in*

speeches by Kofi Annan and Carly Fiorina and exemplified by the case study presented of Nike's efforts to rebuild the trust of customers. The increasingly complex conditions of the modern global economy emerged as another recurring theme, as the participants considered the effect of the growing spectrum of stakeholders on issues of corporate governance. The third common theme was the inescapability of technological and scientific change, from the Internet as a marketing tool to the organizational impact of information technology.

*Teaching Computational Thinking Aug 31 2022* A guide for educators to incorporate computational thinking—a set of cognitive skills applied to problem solving—into a broad range of subjects. Computational thinking—a set of mental and cognitive tools applied to problem solving—is a fundamental skill that all of us (and not just computer scientists) draw on. Educators have found that computational thinking enhances learning across a range of subjects and reinforces students' abilities in reading, writing, and arithmetic. This book offers a guide for incorporating computational thinking into middle school and high school classrooms, presenting a series of activities, projects, and tasks that employ a range of pedagogical practices and cross a variety of content areas. As students problem solve, communicate, persevere, work as a team, and learn from mistakes, they develop a concrete understanding of the abstract principles used in computer science to create code and other digital artifacts. The book guides students and teachers to integrate computer programming with visual art and geometry, generating abstract expressionist-style images; construct topological graphs that represent the relationships between characters in such literary works as *Harry Potter and the Sorcerer's Stone* and *Romeo and Juliet*; apply Newtonian physics to the creation of computer games; and locate, analyze, and present empirical data relevant to social and political issues. Finally, the book lists a variety of classroom resources, including the programming languages Scratch (free to all) and CodeSters (free to teachers). An accompanying website contains the executable programs used in the book's activities.

*Active Matter Sep 19 2021* The first book on active matter, an emerging field focused on programming physical materials to assemble themselves, transform autonomously, and react to information. The past few decades brought a revolution in computer software and hardware; today we are on the cusp of a materials revolution. If yesterday we programmed computers and other machines, today we program matter itself. This has created new capabilities in design, computing, and fabrication, which allow us to program proteins and bacteria, to generate self-transforming wood products and architectural details, and to create clothing from "intelligent textiles" that grow themselves. This book offers essays and sample projects from the front lines of the emerging field of active matter. Active matter and programmable materials are at the intersection of science, art, design, and engineering, with applications in fields from biology and computer science to architecture and fashion. These essays contextualize current work and explore recent research. Sample projects, generously illustrated in color, show the range of possibilities envisioned by their makers. Contributors explore the design of active material at scales from nano to micro, kilo, and even planetary. They investigate processes of self-assembly at a microscopic level; test new materials that can sense and actuate themselves; and examine the potential of active matter in the built environment and in living and artificial systems. *Active Matter* is an essential guide to a field that could shape the future of design.