Complexity Theories Of Cities Have Come Of Age An Overview With Implications To Urban Planning And Design

Chaos and complexity are the new buzz words in both science and contemporary society. The ideas they represent have enormous implications for the way we understand and engage with the world. Complexity Theory and the Social Sciences introduces students to the central ideas which surround the chaos/complexity theories. It discusses key concepts before using them as a way of investigating the nature of social research. By applying them to such familiar topics as urban studies, education and health, David Byrne allows readers new to the subject to appreciate the contribution which complexity theory can make to social research and to illuminating the crucial social issues of our day.

Provides guidelines for assessing the sustainability of urban systems including theory, methods and case studies.

Spatial planning is about dealing with our 'everyday' environment. In A Planner's Encounter with Complexity we present various understandings of complexity and how the environment is considered accordingly. One of these considerations is

the environment as subject to processes of continuous change, being either progressive or destructive, evolving non-linearly and alternating between stable and dynamic periods. If the environment that is subject to change is adaptive, self-organizing, robust and flexible in relation to this change, a process of evolution and co-evolution can be expected. This understanding of an evolving environment is not mainstream to every planner. However, in A Planner's Encounter with Complexity, we argue that environments confronted with discontinuous, non-linear evolving processes might be more real than the idea that an environment is simply a planner's creation. Above all, we argue that recognizing the 'complexity' of our environment offers an entirely new perspective on our world and our environment, on planning theory and practice, and on the raison d'être of the planners that we are. A Planner's Encounter with Complexity is organized into 17 chapters. It begins with the interplay of planning and complexity from the perspective of contemporary planning theory. It continues by critically assessing planning theory and practice in the light of the interdisciplinary debate regarding complexity thinking. As the book progresses, it positions itself ever closer to the perspective of complexity thinking, looking at the planning discipline 'from the outside in', clarifying the facets of complexity and its importance in planning. Finally, conceptual and theoretical developments towards

more applied examples are identified in order to see the interplay of planning and complexity in practice. This book emphasizes the importance of complexity in planning, clarifies many of the concepts and theories, presents examples on planning and complexity, and proposes new ideas and methods for planning. Understanding Complex Urban Systems takes as its point of departure the insight that the challenges of global urbanization and the complexity of urban systems cannot be understood – let alone 'managed' – by sectoral and disciplinary approaches alone. But while there has recently been significant progress in broadening and refining the methodologies for the quantitative modeling of complex urban systems, in deepening the theoretical understanding of cities as complex systems, or in illuminating the implications for urban planning, there is still a lack of well-founded conceptual thinking on the methodological foundations and the strategies of modeling urban complexity across the disciplines. Bringing together experts from the fields of urban and spatial planning, ecology, urban geography, real estate analysis, organizational cybernetics, stochastic optimization, and literary studies, as well as specialists in various systems approaches and in transdisciplinary methodologies of urban analysis, the volume seeks to advance the discussion on multidisciplinary approaches to urban modeling. While engaging with the 'state of the art' in their

respective fields, the contributions are specifically written for both experts from a broad range of disciplines as well as for urban practitioners who feel the need for new approaches given the uncertainty of current developments.

Today, our cities are an embodiment of the complex, historical evolution of knowledge, desires and technology. Our planned and designed activities co-evolve with our aspirations, mediated by the existing technologies and social structures. The city represents the accretion and accumulation of successive layers of collective activity, structuring and being structured by other, increasingly distant cities, reaching now right around the globe. This historical and structural development cannot therefore be understood or captured by any set of fixed quantitative relations. Structural changes imply that the patterns of growth, and their underlying reasons change over time, and therefore that any attempt to control the morphology of cities and their patterns of flow by means of planning and design, must be dynamical, based on the mechanisms that drive the changes occurring at a given moment. This carefully edited post-proceedings volume gathers a snapshot view by leading researchers in field, of current complexity theories of cities. In it, the achievements, criticisms and potentials yet to be realized are reviewed and the implications to planning and urban design are assessed.

This book examines the introduction of smart technologies into public administrations and the organizational issues caused by these implementations, and the potential of information and communication technologies (ICTs) to rationalize and improve government, transform governance and organizational issues, and address economic, social, and environmental challenges. Cities are increasingly using new technologies in the delivery of public sector services and in the improvement of government transparency, business-led urban development, and urban sustainability. The book will examine specific smart projects that cities are embracing to improve transparency, efficiency, sustainability, mobility, and whether all cities are prepared to implement smart technologies and the incentives for promoting implementation. This focus on the smart technologies applied to public sector entities will be of interest to academics, researchers, policy-makers, public managers, international organizations and technical experts involved in and responsible for the governance, development and design of Smart Cities.

Imagine living in a city where people could move freely and buildings could be replaced at minimal cost. Reality cannot be further from such. Despite this imperfect world in which we live, urban planning has become integral and critical especially in the face of rapid urbanization in many developing and developed

countries. This book introduces the axiomatic/experimental approach to urban planning and addresses the criticism of the lack of a theoretical foundation in urban planning. With the rise of the complexity movement, the book is timely in its depiction of cities as complex systems and explains why planning from within is useful in the face of urban complexity. It also includes policy implications for the Chinese cities in the context of axiomatic/experimental planning theory. Contemporary cities face phenomenal risks, and they face particularly high levels of mounting social and environmental risks, including social polarization, urban conflicts, riots, terror, and climate change threats. This book suggests that climate change and its resulting uncertainties challenge the concepts, procedures, and scope of conventional approaches to planning, creating a need to rethink and revise current planning methods. Therefore, this book suggests a paradigm shift in our thinking, interrogation, and planning of our cities. Based on the contemporary conditions of risk at cities, this book conceptualizes the risk city as a construct of three interlinked concepts of risk, trust, and practice. It is a construct of risk and its new evolving conditions and knowledge of uncertainties stem from climate change and other risks and uncertainties. As a construct of practices, the risk city produces social and political institutional framework and promotes practices accordingly in order to reduce risk and risk possibilities and to

increase trust. In light of the complex challenges and risks to the human habitat that have emerged in recent years, many cities have prepared various types of plans aimed at addressing the challenges posed by climate change. Nonetheless, despite the importance of these plans and the major public resources invested in their formulation, we still know little about them and have yet to begin studying them and assessing their contributions . From the innovative perspective of the risk city, this book asks critical questions about the nature, vision, practices, and potential impact of the recent climate change-oriented plans. What kinds of risks do they attempt to address, what types of practices do they institute, and what types of approaches do they apply? Do they adequately address the risks and uncertainties posed? How do they contribute to the worldwide effort to reduce greenhouse gas emissions? This book uses the methodologically innovative Risk City framework to examine the nature, vision, outcomes, practices, and impact of these crucial plans, as well as their contribution to the resilience of our cities and to global efforts toward reducing greenhouse gas emissions.

This book presents emerging work in the co-evolving fields of design-led systemics, referred to as systemic design to distinguish it from the engineering and hard science epistemologies of system design or systems engineering.

There are significant societal forces and organizational demands impelling the requirement for “better means of change” through integrated design practices of systems and services. Here we call on advanced design to lead programs of strategic scale and higher complexity (e.g., social policy, healthcare, education, urbanization) while adapting systems thinking methods, creatively pushing the boundaries beyond the popular modes of systems dynamics and soft systems. Systemic design is distinguished by its scale, social complexity and integration – it is concerned with higher-order systems that that entail multiple subsystems. By integrating systems thinking and its methods, systemic design brings human-centred design to complex, multi-stakeholder service systems. As designers engage with ever more complex problem areas, it is necessary to draw on a basis other than individual creativity and contemporary “design thinking” methods. Systems theories can co-evolve with a new school of design theory to resolve informed action on today’s highly resilient complex problems and can deal effectively with demanding, contested and high-stakes challenges.

Urban change is often difficult because we are dealing with people’s elusive notions of place and perception, time and change. Urban design and planning in a changing urban context so that it remains relevant for people is elusive because the idea of place is embedded in memory and identity – but whose

memory and whose identity? This book seeks to understand the urban change dynamic so that the planning of urban places aligns with the dynamic of people's perception of place. Planning Urban Places examines the premise that building cities is a concrete business surrounded by a shifting context. It discusses the notion of urban design and placemaking from the perspective of place perception and cognitive psychology, place philosophy and human geography. It also considers network theory to help illustrate the self-organising paradigm of small word network theory for planning urban places.

A novel, integrative approach to cities as complex adaptive systems, applicable to issues ranging from innovation to economic prosperity to settlement patterns. Human beings around the world increasingly live in urban environments. In Introduction to Urban Science, Luis Bettencourt takes a novel, integrative approach to understanding cities as complex adaptive systems, claiming that they require us to frame the field of urban science in a way that goes beyond existing theory in such traditional disciplines as sociology, geography, and economics. He explores the processes facilitated by and, in many cases, unleashed for the first time by urban life through the lenses of social heterogeneity, complex networks, scaling, circular causality, and information. Though the idea that cities are complex adaptive systems has become

mainstream, until now those who study cities have lacked a comprehensive theoretical framework for understanding cities and urbanization, for generating useful and falsifiable predictions, and for constructing a solid body of empirical evidence so that the discipline of urban science can continue to develop. Bettencourt applies his framework to such issues as innovation and development across scales, human reasoning and strategic decision-making, patterns of settlement and mobility and their influence on socioeconomic life and resource use, inequality and inequity, biodiversity, and the challenges of sustainable development in both high- and low-income nations. It is crucial, says Bettencourt, to realize that cities are not "zero-sum games" and that knowledge, human cooperation, and collective action can build a better future.

A clear methodological and philosophical introduction to complexity theory as applied to urban and regional systems is given, together with a detailed series of modelling case studies compiled over the last couple of decades. Based on the new complex systems thinking, mathematical models are developed which attempt to simulate the evolution of towns, cities, and regions and the complicated co-evolutionary interaction there is both between and within them. The aim of these models is to help policy analysis and decision-making in urban and regional planning, energy policy, transport policy, and many other areas of

service provision, infrastructure planning, and investment that are necessary for a successful society.

The book offers a novel approach to the study of the complex dynamics of cities. It is based on (1) Synergetics as a science of cooperation and selforganization, (2) information theory including semantic and pragmatic aspects, and optimization principles, (3) a theory of steady state maintenance, and of (4) phase transition, i.e. qualitative changes of structure or behavior. From this novel theoretical vantage point, the book addresses particularly three issues that stand at the core of current discourse on cities: Urban Scaling, Smart Cities and City Planning. An important consequence of the 21st century as the age of cities is that the study of cities currently attracts scientists from a variety of disciplines, ranging from physics, mathematics and computer science, through urban studies, architecture, planning and human geography, to economics, psychology, sociology, public administration and more. The book is thus likely to attract scholars, researchers and students of these research domains, of complexity theories of cities, as well as of general complexity theory. In addition, it is directed also to practitioners of urbanism, city planning and urban design.

This book presents a theory as well as methods to understand and to purposively influence complex systems. It suggests a theory of complex systems as nested

systems, i. e. systems that enclose other systems and that are simultaneously enclosed by even other systems. According to the theory presented, each enclosing system emerges through time from the generative activities of the systems they enclose. Systems are nested and often emerge unplanned, and every system of high dynamics is enclosed by a system of slower dynamics. An understanding of systems with faster dynamics, which are always guided by systems of slower dynamics, opens up not only new ways to understanding systems, but also to effectively influence them. The aim and subject of this book is to lay out these thoughts and explain their relevance to the purposive development of complex systems, which are exemplified in case studies from an urban system. The interested reader, who is not required to be familiar with system-theoretical concepts or with theories of emergence, will be guided through the development of a theory of emergent nested systems. The reader will also learn about new ways to influence the course of events - even though the course of events is, in principle, unpredictable, due to the ever-new emergence of real novelty.

Book Award Finalist for Urban Design Group Awards 2020 Human settlements are the result of a mix of self-organisation and planning. Planners are fighting a losing battle to impose order on chaotic systems. Connections between the

process of urban growth and the fields of complexity theory are of increasing importance to planners and urbanists alike; the idea that cities are emergent structures created not by design but from the interplay of relatively simple rules and forces over time. From the the small Tuscan hill town to the megacities of Asia: the struggle between the planned and the unplanned is universal. Based on years of international research, Climax City is a critical exploration of the growth of cities and masterplanning. Challenging the idea that the city can be entirely planned on paper, this book implores you to work with chaos when planning cities. Beautifully illustrated with striking hand-drawn plans of global cities, this is a vital and accessible contribution to urban theory and planning. It's the perfect title for practitioners and academics across planning and urban design looking to make sense out of chaos.

Guided by the multifaceted relations between city and text, Charting Literary Urban Studies: Texts as Models of and for the City attempts to chart the burgeoning field of literary urban studies by outlining how texts in varying degrees function as both representations of the city and as blueprints for its future development. The study addresses questions such as these: How do literary texts represent urban complexities – and how can they capture the uniqueness of a given city? How do literary texts simulate layers of urban

memory – and how can they reinforce or help dissolve path dependencies in urban development? What role can literary studies play in interdisciplinary urban research? Are the blueprints or 'recipes' for urban development that most quickly travel around the globe – such as the 'creative city', the 'green city' or the 'smart city' – really always the ones that best solve a given problem? Or is the global spread of such travelling urban models not least a matter of their narrative packaging? In answering these key questions, this book also advances a literary studies contribution to the general theory of models, tracing a heuristic trajectory from the analysis of literary texts as representations of urban developments to an analysis of literary strategies in planning documents and other pragmatic, non-literary texts.

The Routledge Handbook of Planning Theory presents key contemporary themes in planning theory through the views of some of the most innovative thinkers in planning. They introduce and explore their own specialized areas of planning theory, to conceptualize their contemporary positions and to speculate how these positions are likely to evolve and change as new challenges emerge. In a changing and often unpredictable globalized world, planning theory is core to understanding how planning and its practices both function and evolve. As illustrated in this book, planning and its many roles have changed profoundly over the recent decades; so have the theories, both critical and explanatory, about its practices, values and knowledges. In the context of these changes, and to contribute to the development of planning

research, this handbook identifies and introduces the cutting edge, and the new emerging trajectories, of contemporary planning theory. The aim is to provide the reader with key insights into not just contemporary planning thought, but potential future directions of both planning theory and planning as a whole. This book is written for an international readership, and includes planning theories that address, or have emerged from, both the global North and parts of the world beyond.

'Over recent years Complexity Science has revealed to us new limits to our possible knowledge and control in social, cultural and economic systems. Instead of supposing that past statistics and patterns will give us predictable outcomes for possible actions, we now know the world is, and will always be, creative and surprising. Continuous structural evolution within such systems may change the mechanisms, descriptors, problems and opportunities, often negating policy aims. We therefore need to redevelop our thinking about interventions, policies and policy making, moving perhaps to a humbler, more 'learning' approach. In this Handbook, leading thinkers in multiple domains set out these new ideas and allow us to understand how these new ideas are changing policymaking and policies in this new era.' - Peter M Allen, Cranfield University, UK

Complexity, complex systems and complexity theories are becoming increasingly important within a variety disciplines. While these issues are less well known within the discipline of spatial planning, there has been a recent growing awareness and interest. As planners grapple with how to consider the vagaries of the real world when putting together proposals for future development, they question how complexity, complex systems and complexity theories might prove useful with regard to spatial planning and the physical environment. This book provides

a readable overview, presenting and relating a range of understandings and characteristics of complexity and complex systems as they are relevant to planning. It recognizes multiple, relational approaches of dynamic complexity which enhance understandings of, and facilitate working with, contingencies of place, time and the various participants' behaviours. In doing so, it should contribute to a better understanding of processes with regard to our physical and social worlds.

This book is a selection of the best and peer-reviewed articles presented at the CUPUM (Computers in Urban Planning and Urban Management) conference, held in the second week of July 2015 at MIT in Boston, USA. The contributions provide state-of the art overview of the availability and application of Planning Support Systems (PSS) in the framework of Smart Cities.

What is "urban"? How can it be described and contextualised? How is it used in theory and practice? Urban processes feature in key international policy and practice discourses. They are at the core of research agendas across traditional academic disciplines and emerging interdisciplinary fields. However, the concept of "the urban" remains highly contested, both as material reality and imaginary construct. The urban remains imprecisely defined. Defining the Urban is an indispensable guide for the urban transdisciplinary thinker and practitioner. Parts I and II focus on how "Academic Disciplines" and "Professional Practices," respectively, understand and engage with the urban. Included, among others, are Architecture, Ecology, Governance and Sociology. Part III, "Emerging Approaches," outlines how elements from theory and practice combine to form transdisciplinary tools and perspectives. Written by eminent experts in their respective fields, Defining the Urban provides a stepping stone for the

development of a common language—a shared ontology—in the disjointed fields of urban research and practice. It is a comprehensive and accessible resource for anyone with an interest in understanding how urban scholars and practitioners can work together on this complex theme.

Recent technological advancements and other related factors and trends are contributing to the production of an astoundingly large and rapidly accelerating collection of data, or 'Big Data'. This data now allows us to examine urban and regional phenomena in ways that were previously not possible. Despite the tremendous potential of big data for regional science, its use and application in this context is fraught with issues and challenges. This book brings together leading contributors to present an interdisciplinary, agenda-setting and action-oriented platform for research and practice in the urban and regional community. This book provides a comprehensive, multidisciplinary and cutting-edge perspective on big data for regional science. Chapters contain a collection of research notes contributed by experts from all over the world with a wide array of disciplinary backgrounds. The content is organized along four themes: sources of big data; integration, processing and management of big data; analytics for big data; and, higher level policy and programmatic considerations. As well as concisely and comprehensively synthesising work done to date, the book also considers future challenges and prospects for the use of big data in regional science. Big Data for Regional Science provides a seminal contribution to the field of regional science and will appeal to a broad audience, including those at all levels of academia, industry, and government.

New and classical results in computational complexity, including interactive proofs, PCP, derandomization, and quantum computation. Ideal for graduate students.

Complexity Theories of Cities Have Come of AgeAn Overview with Implications to Urban Planning and DesignSpringer Science & Business Media

This book contains the contributions presented at the international workshop "The Dynamics of Complex Urban Systems: an interdisciplinary approach" held in Ascona, Switzerland in November 2004. Experts from several disciplines outline a conceptual framework for modeling and forecasting the dynamics of both growth-limited cities and megacities. Coverage reflects the various interdependencies between structural and social development.

Governing Complexity in the 21st Century surveys the ways in which social systems are becoming more complex. It shows how this complexity impacts every aspect of life for individuals, governments and societies in most social systems at individual, regional, national and global scales and explores how embracing ‘complexity thinking’ can greatly improve the art of governance in all policy areas. The book clearly explains the ideas and methods of complexity science—widely accepted in both the natural and social sciences—then demonstrates how ‘complexity thinking’ can be applied to improve our understanding of governance and policy actions. Providing a deep analysis of many governance challenges, including economic development and technological innovation, environment management, climate change and development in the Middle East, the book also compares national responses to the COVID-19 pandemic. Clear and jargon-free, this book is accessible to undergraduates and scholars alike. It is

essential reading for policymakers everywhere, showcasing methods for governing effectively and efficiently in our increasingly complex world. It brings together the broad range of social and environmental science fields and will be useful for those studying or working in policy, politics and international relations, environmental issues, business management, philosophy, history and sociology.

Permaculture is more than just the latest buzzword; it offers positive solutions for many of the environmental and social challenges confronting us. And nowhere are those remedies more needed and desired than in our cities.The Permaculture City provides practical guidance and plenty of examples for creating abundant food, energy security, close-knit communities, local and meaningful livelihoods, and sustainable policies in our cities and towns. Permaculturists have learned that the same nature-based approach that works so beautifully for growing food—connecting the pieces of the landscape together in harmonious ways—applies perfectly to many of our other needs. This book shows, in the stories of the innovators who are doing it as well as in how-to instructions, how permaculture design can help towndwellers solve the challenges of meeting our needs for food, water, shelter, energy, community, and livelihood in sustainable, resilient ways.

This book both analyzes and synthesizes new cutting-edge theories and methods for future design implementations in smart cities through interdisciplinary synergizing of architecture, technology, and the Internet of Things (IoT). Implementation of IoT

enables the collection and data exchange of objects embedded with electronics, software, sensors, and network connectivity. Recently IoT practices have moved into uniquely identifiable objects that are able to transfer data directly into networks. This book features new technologically advanced ideas, highlighting properties of smart future city networks. Chapter contributors include theorists, computer scientists, mathematicians, and interdisciplinary planners, who currently work on identifying theories, essential elements, and practices where the IoT can impact the formation of smart cities and sustainability via optimization, network analyses, data mining, mathematical modeling and engineering. Moreover, this book includes research-based theories and real world practices aimed toward graduate researchers, experts, practitioners and the general public interested in architecture, engineering, mathematical modeling, industrial design, computer science technologies, and related fields.

Urban design is a process of establishing a structural order within human settlements; responding to dynamic emergent meanings and functions in a constant state of flux. The planning/design process is complex due to the myriad of on-going (urban) organizational and structural relationships and contexts. This book reconnects the process with outcomes on the ground, and puts thinking about design back at the heart of what planners do. Mixing accessible theory, practical examples, and carefully designed exercises in composition from simple to complex settings, Urban Design is an

essential textbook for classrooms and design studios across the full spectrum of planning and urban studies fields. Filled with color illustrations and graphics of excellent projects, it gives students tools to enable them to sketch, draw, design, and above all, to think. This new edition remains focused on instructing the student, professional and layperson in the elements and principles of design composition so that they can diverge from conventional and packaged solutions in pursuit of a meaningful and creative urbanism. This edition builds upon established design principles and encourages the student in creative ways to depart from them as appropriate in dealing with the complexity of culture, space and time dynamics of cities. The book identifies the elements and principles of compositions and explores compositional order and structure as they relate to the meaning and functionality of cities. It discusses new directions and methods, and outlines the importance of both buildings and the open spaces between them.

In recent years, there has been a new understanding of how cities evolve and function, which reflects the emergent paradigm of complexity. The crux of this view is that cities are created by differentiated actors involved in individual, small-scale projects interacting in a complex way in the urban development process. This 'bottom up' approach to urban modeling not only transforms our understanding of cities, but also improves our capabilities of harnessing the urban development process. For example, we used to think that plans control urban development in an aggregate, holistic way, but

what actually happens is that plans only affect differentiated actors in seeking their goals through information. In other words, plans and regulations set restrictions or incentives of individual behaviour in the urban development process through imposing rights, information, and prices, and the analysis of the effects of plans and regulations must take into account the complex urban dynamics at a disaggregate level of the urban development process. Computer simulations provide a rigorous, promising analytic tool that serves as a supplement to the traditional, mathematical approach to depicting complex urban dynamics. Based on the emergent paradigm of complexity, the book provides an innovative set of arguments about how we can gain a better understanding of how cities emerge and function through computer simulations, and how plans affect the evolution of complex urban systems in a way distinct from what we used to think they should. Empirical case studies focus on the development of a compact urban hierarchy in Taiwan, China, and the USA, but derive more generalizable principles and relationships among cities, complexity, and planning.

Complexity, Cognition and the City aims at a deeper understanding of urbanism, while invoking, on an equal footing, the contributions both the hard and soft sciences have made, and are still making, when grappling with the many issues and facets of regional planning and dynamics. In this work, the author goes beyond merely seeing the city as a self-organized, emerging pattern of some collective interaction between many stylized urban "agents" – he makes the crucial step of attributing cognition to his agents and

thus raises, for the first time, the question on how to deal with a complex system composed of many interacting complex agents in clearly defined settings. Accordingly, the author eventually addresses issues of practical relevance for urban planners and decision makers. The book unfolds its message in a largely nontechnical manner, so as to provide a broad interdisciplinary readership with insights, ideas, and other stimuli to encourage further research – with the twofold aim of further pushing back the boundaries of complexity science and emphasizing the all-important interrelation of hard and soft sciences in recognizing the cognitive sciences as another necessary ingredient for meaningful urban studies.

The global financial and economic crisis that hit the world since 2008 has affected the lives of many people all over the world and resulted in declining incomes, rising unemployment, foreclosures, forced residential moves, and cut-backs in government expenditure. The extent to which the crisis has affected urban neighborhoods and has led to rising intra-urban inequalities, has not yet received much attention. The implemented budget cuts and austerity programs of national and local governments are likely to have hit some neighborhoods more than others. The authors of this this book, which come from a variety of countries and disciplines, show that the economic crisis has affected poor neighborhoods more severely than more affluent ones. The tendency of the state to retreat from these neighborhoods has negative consequences for their residents and may even nullify the investments that have been made in many poor

neighborhoods in the recent past. This book was originally published as a special issue of Urban Geography.

Mario Carpo provides a subtle and insightful discussion of the intellectual structures that guide architectural composition and the ways that these structures were transformed by the historic shifts from script to print and from hand-made drawings to mechanically reproduced images. He goes on to suggest that the current shift from print to digital representations will have similarly profound consequences. This is a crucial text for anyone interested in the interrelationships of media and design processes. As urban planning moves from a centralized, top-down approach to a decentralized, bottom-up perspective, our conception of urban systems is changing. In Cities and Complexity, Michael Batty offers a comprehensive view of urban dynamics in the context of complexity theory, presenting models that demonstrate how complexity theory can embrace a myriad of processes and elements that combine into organic wholes. He argues that bottom-up processes—in which the outcomes are always uncertain—can combine with new forms of geometry associated with fractal patterns and chaotic dynamics to provide theories that are applicable to highly complex systems such as cities. Batty begins with models based on cellular automata (CA), simulating urban dynamics through the local actions of automata. He then introduces agent-based models (ABM), in which agents are mobile and move between locations. These models relate to many scales, from the scale of the street to patterns and structure at the scale of the urban region. Finally, Batty develops applications of all these models to specific urban situations, discussing concepts of criticality, threshold, surprise, novelty, and phase transition in the context of spatial developments. Every theory and model presented in the book is developed through examples that range from the simplified and

hypothetical to the actual. Deploying extensive visual, mathematical, and textual material, Cities and Complexity will be read both by urban researchers and by complexity theorists with an interest in new kinds of computational models. Sample chapters and examples from the book, and other related material, can be found at http://www.complexcity.info

This book, which resulted from an intensive discourse between experts from several disciplines – complexity theorists, cognitive scientists, philosophers, urban planners and urban designers, as well as a zoologist and a physiologist – addresses various issues regarding cities. It is a first step in responding to the challenge of generating just such a discourse, based on a dilemma identified in the CTC (Complexity Theories of Cities) domain. The latter has demonstrated that cities exhibit the properties of natural, organic complex systems: they are open, complex and bottom-up, have fractal structures and are often chaotic. CTC have further shown that many of the mathematical formalisms and models developed to study material and organic complex systems also apply to cities. The dilemma in the current state of CTC is that cities differ from natural complex systems in that they are hybrid complex systems composed, on the one hand, of artifacts such as buildings, roads and bridges, and of natural human agents on the other. This raises a plethora of new questions on the difference between the natural and the artificial, the cognitive origin of human action and behavior, and the role of planning and designing cities. The answers to these questions cannot come from a single discipline; they must instead emerge from a discourse between experts from several disciplines engaged in CTC.

Thirty years after its publication, The Death and Life of Great American Cities was described by The New York Times as "perhaps the most influential single work in the history of town planning....[It] can also be seen in a much larger context. It is first of all a work of literature; the

descriptions of street life as a kind of ballet and the bitingly satiric account of traditional planning theory can still be read for pleasure even by those who long ago absorbed and appropriated the book's arguments." Jane Jacobs, an editor and writer on architecture in New York City in the early sixties, argued that urban diversity and vitality were being destroyed by powerful architects and city planners. Rigorous, sane, and delightfully epigrammatic, Jacobs's small masterpiece is a blueprint for the humanistic management of cities. It is sensible, knowledgeable, readable, indispensable. The author has written a new foreword for this Modern Library edition.

Written by some of the founders of complexity theory and complexity theories of cities (CTC), this Handbook expertly guides the reader through over forty years of intertwined developments: the emergence of general theories of complex self-organized systems and the consequent emergence of CTC.

The Virtual and the Real in Planning and Urban Design: Perspectives, Practices and Applications explores the merging relationship between physical and virtual spaces in planning and urban design. Technological advances such as smart sensors, interactive screens, locative media and evolving computation software have impacted the ways in which people experience, explore, interact with and create these complex spaces. This book draws together a broad range of interdisciplinary researchers in areas such as architecture, urban design, spatial planning, geoinformation science, computer science and psychology to introduce the theories, models, opportunities and uncertainties involved in the interplay between virtual and physical spaces. Using a wide range of international contributors, from the UK, USA, Germany, France, Switzerland, Netherlands and Japan, it provides a framework for assessing how new

technology alters our perception of physical space.
In the contemporary city, the physical infrastructure and sensorial experiences of two millennia are now inter-woven within an invisible digital matrix. This matrix alters human perceptions of the city, informs our behaviour and increasingly influences the urban designs we ultimately inhabit. Digital Futures and the City of Today cuts through these issues to analyse the work of architects, designers, media specialists and a growing number of community activists, laying out a multi-faceted view of the complex integrated phenomenon of the contemporary city. Split into three sections, the book interrogates the concept of the 'smart' city, examines innovative digital projects from around the world, documents experimental visions for the future, and describes projects that engage local communities in the design process.