Analysis And Design Of Resilient Vlsi Circuits

This book constitutes the proceedings of the 5th International Workshop on Design, Modeling, and Evaluation of Cyber Physical Systems, CyPhy 2015, held as part of ESWeek 2015, in Amsterdam, The Netherlands, in October 2015. The 10 papers presented in this volume were carefully reviewed and selected from 13 submissions. They broadly interpret, from a diverse set of disciplines, the modeling, simulation, and evaluation of cyber-physical systems.

This book presents a paradigm for designing new generation resilient and evolving computer systems, including their key concepts, elements of supportive theory, methods of analysis and synthesis of ICT with new properties of evolving functioning, as well as implementation schemes and their prototyping. The book explains why new ICT applications require a complete redesign of computer systems to address challenges of extreme reliability, high performance, and power efficiency. The authors present a comprehensive treatment for designing the next generation of computers, especially addressing safety critical, autonomous, real time, military, banking, and wearable health care systems.

"Resilient by design provides managers with a more complete approach to creating lasting success in a changing world. Rich with examples and case studies, it explains how to connect the external systems, stakeholders, communities, infrastructure, supply chains, and natural resources, to create innovative organisations that survive and prosper." --Publisher description.

Presenting a fundamental definition of resilience, the book examines the concept of resilience as it relates to space system design. The book establishes the required definitions, relates its place to existing state-of-the-art systems engineering practices, and explains the process and mathematical tools used to achieve a resilient design. It discusses a variety of potential threats and their impact upon a space system. By providing multiple, real-world examples to illustrate the application of the design methodology, the book covers the necessary techniques and tools, while guiding the reader through the entirety of the process. The book begins with space systems basics to ensure the reader is versed in the functions and components of the system prior to diving into the details of resilience. However, the text does not assume that the reader has an extensive background in the subject matter of resilience. This book is aimed at engineers and architects in the areas of aerospace, space systems, and space communications.

Although many software books highlight open problems in secure software development, few provide easily actionable, ground-level solutions. Breaking the mold, Secure and Resilient Software Development teaches you how to apply best practices and standards for consistent and secure software development. It details specific quality software developmen

Sustainable and resilient critical infrastructure systems is an emerging paradigm in an evolving era of depleting assets in the midst of natural and man-made threats to provide a sustainable and high quality of life with optimized resources from social, economic, societal and environmental considerations. The increasing complexity and interconnectedness of civil and other interdependent infrastructure systems (electric power, energy, cyber-infrastructures, etc.) require inter- and multidisciplinary expertise required to engineer, monitor, and sustain these distributed large-scale complex adaptive infrastructure systems. This edited book is motivated by recent advances in simulation, modeling, sensing, communications/information, and intelligent and sustainable technologies that have resulted in the development of sophisticated methodologies and instruments to design, characterize, optimize, and evaluate critical infrastructure systems, their resilience, and their condition and the factors that cause their deterioration. Specific topics discussed in this book include, but are not limited to: optimal infrastructure investment allocation for sustainability, framework for manifestation of tacit critical infrastructure knowledge, interdependencies between energy and transportation systems for national long term planning, intelligent transportation infrastructure technologies, emergent research issues in infrastructure interdependence research, framework for assessing the resilience of infrastructure and economic systems, maintenance optimization for heterogeneous infrastructure systems, optimal emergency infrastructure inspection scheduling, and sustainable rehabilitation of deteriorated transportation infrastructure systems.

Experimental Vibration Analysis for Civil Structures: Testing, Sensing, Monitoring, and Control covers a wide range of topics in the areas of vibration testing, instrumentation, and analysis of civil engineering and critical infrastructure. It explains how recent research, development, and applications in experimental vibration analysis of civil engineering structures have progressed significantly due to advancements in the fields of sensor and testing technologies, instrumentation, data acquisition systems, computer technology, computational modeling and simulation of large and complex civil infrastructure systems. The book also examines how cutting-edge artificial intelligence and data analytics can be applied to infrastructure systems. Features: Explains how recent technological developments have resulted in addressing the challenge of designing more resilient infrastructure Examines numerous research studies conducted by leading scholars in the field of infrastructure systems and civil engineering Presents the most emergent fields of civil engineering design, such as data analytics and Artificial Intelligence for the analysis and performance assessment of infrastructure systems and their resilience Emphasizes the importance of an interdisciplinary approach to develop the modeling, analysis, and experimental tools for designing more resilient and intelligent infrastructures Appropriate for practicing engineers and upper-level students, Experimental Vibration Analysis for Civil Structures: Testing, Sensing, Monitoring, and Control serves as a strategic roadmap for further research in the field of vibration testing and instrumentation of infrastructure systems.

5th International Workshop, CyPhy 2015, Amsterdam, The Netherlands, October 8, 2015, Proceedings
Software Engineering for Resilient Systems
The Resilient Infrastructure Opportunity
Smart Grid Control
Resilient Design and Construction of Geostructures Against Natural Hazards
Summary of a Workshop
A National Imperative
Rebuild by Design
Mitigating Soft Errors and Process Variations
Designing for Resilience
Cyber Physical Systems. Design, Modeling, and Evaluation
Analysis and Design of Resilient VLSI Circuits

The Bled workshops have traditionally produced reference documents providing visions for the future development of earthquake engineering as foreseen by leading researchers in the field. The participants of the 2011 workshop built on the tradition of these events initiated by Professors Fajfar and Krawinkler to honor their important research contributions and have now produced a book providing answers to crucial questions in today’s earthquake engineering: “What visible changes in the design practice have been brought about by performance-based seismic engineering? What are the critical needs for future advances? What actions should be taken to respond to those needs?” The key answer is that research interests should go beyond the narrow technical aspects and that the seismic resilience of society as a whole should become an essential part of the planning and design process. The book aims to provide essential guidelines for researchers, professionals and students in the field of earthquake engineering. It will also be of particular interest for all those working at insurance companies, governmental, civil protection and emergency management agencies that are responsible for assessing and planning community resilience. The introductory chapter of the book is based on the keynote presentation given at the workshop by the late Professor Helmut Krawinkler. As such, the book includes Helmut’s last and priceless address to the engineering community, together with his vision and advice for the future development of performance-based design, earthquake engineering and seismic risk management.

In the 21st century, architects and engineers are being challenged to produce work that is concurrently sustainable and resilient. Buildings need to mitigate their impact on climate change by minimising their carbon footprint, while also countering the challenging new weather conditions. Globally, severe storms, extreme droughts and rising sea levels are becoming an increasingly reoccurring feature. To respond, a design process is required that seeks to integrate resiliency by building in the capacity to absorb the impacts of these disruptive events and adapt over time to further changes, while simultaneously being part of the solution to the problem itself. This issue of AD is guest-edited by the interdisciplinary team at Stevens Institute of Technology who developed the winning entry for the 2015 US Department of Energy Solar Decathlon competition, the SU+RE House. While particular focus is paid to this student designed and built prototype home, the publication also provides a broader discussion of the value of design-build as a model for tackling the issue of integrating sustainability and resilience, and what changes are required across education, policy, practice and industry for widespread implementation. Contributors include: Bronwyn Barry, Michael Bruno, Alex Carpenter, Adam Cohen, Ann Holtzman, Ken Levenson, Brady Peters, Terri Peters, Karin Stieldorf, Alex Washburn, Claire Weisz, and Graham Wright. Featured architects: 3XN/GXN, FXFOWLE Architects, Local Office Landscape Architecture (LOLA), Lateral Office, Skidmore, Owings & Merrill (SOM), Snohetta, Structures Design Build, and WXY Studio.

Infrastructure—electricity, telecommunications, roads, water, and sanitation—are central to people’s lives. Without it, they cannot make a living, stay healthy, and maintain a good quality of life. Access to basic infrastructure is also a key driver of economic development. This report lays out a framework for understanding infrastructure resilience - the ability of infrastructure systems to function and meet users’ needs during and after a natural hazard. It focuses on four infrastructure systems that are essential to economic activity and people’s well-being: power systems, including the generation, transmission, and distribution of electricity; water and sanitation—especially water utilities; transport systems—multiple modes such as road, rail, waterway, and airports, and multiple scales, including urban transit and rural access; and telecommunications, including telephone and Internet connections.

Increasing demand on improving the resiliency of modern structures and infrastructure requires ever more critical and complex designs. Therefore, the need for accurate and efficient approaches to assess uncertainties in loads, geometry, material properties, manufacturing processes, and operational environments has increased significantly. Reliability-based techniques help develop more accurate initial guidance for robust design and help to identify the sources of significant uncertainty in structural systems. Reliability-Based Analysis and Design of Structures and Infrastructure presents an overview of the methods of classical reliability analysis and design most associated with structural reliability. It also introduces more modern methods and advancements, and emphasizes the most useful methods and techniques used in reliability and risk studies, while elaborating their practical applications and limitations rather than detailed derivations. Features: Provides a practical and comprehensive overview of reliability and risk analysis and design techniques. Introduces resilient and smart structures/infrastructure that will lead to more reliable and sustainable societies. Considers loss elimination, risk management and life-cycle asset management as related to infrastructure projects. Introduces probability theory, statistical methods, and reliability analysis methods. Reliability-Based Analysis and Design of Structures and Infrastructure is suitable for researchers and practicing engineers, as well as upper-level students taking related courses in structural reliability analysis and design.

This open access book addresses the way in which urban and urbanizing regions profoundly impact and are impacted by climate change. The editors and authors show why cities must wage simultaneous battles to curb global climate change trends while adapting and transforming to address local climate impacts. This book addresses how cities develop anticipatory and long-range planning capacities for more resilient futures, earnest collaboration across disciplines, and radical reconfigurations of the power regimes that have institutionalized the disenfranchisement of minority groups. Although planning processes consider visions for the future, the editors highlight a more ambitious long-term positive visioning approach that accounts for unpredictability, system dynamics and equity in decision-making. This volume brings the science of urban transformation together with practices of professionals who govern and manage our social, ecological and technological systems to design processes by which cities may achieve resilient urban futures in the face of climate change.

In the resilience engineering approach to safety, failures and successes are seen as two different outcomes of the same underlying process, namely how people and organizations cope with complex, underspecified and therefore partly unpredictable work environments. Therefore safety can no longer be ensured by constraining performance and eliminating risks. Instead, it is necessary to actively manage how people and organizations adjust what they do to meet the current conditions of the workplace, by trading off efficiency and thoroughness and by making sacrificing decisions. The Ashgate Studies in Resilience Engineering series promulgates new methods, principles and experiences that can complement established safety management approaches, providing invaluable insights and guidance for practitioners and researchers alike in all safety-critical domains. While the Studies pertain to all complex systems they are of particular interest to high hazard sectors such as aviation, ground transportation, the military, energy production and distribution, and healthcare. Published periodically within this series will be edited volumes titled Resilience Engineering Perspectives. The first volume, Remaining Sensitive to the Possibility of Failure, presents a collection of 20 chapters from international experts. This collection deals with important issues such as measurements and models, the use of procedures to ensure safety, the relation between resilience and robustness, safety management, and the use of risk analysis. The final six chapters utilise the report from a serious medical accident to illustrate more concretely how resilience engineering can make a difference, both to the understanding of how accidents happen and to what an organisation can do to become more resilient.

This book constitutes the refereed proceedings of the 8th International Workshop on Software Engineering for Resilient Systems, SERENE 2016, held in Gothenburg, Sweden, in September 2016.The 10 papers presented were carefully reviewed and selected from 15 submissions. They cover the following areas: development of resilient systems; incremental development processes for resilient systems; requirements engineering and re-engineering for resilience; frameworks, patterns and software architectures for resilience; engineering of self-healing autonomic systems; design of trustworthy and intrusion-safe systems; resilience at run-time (mechanisms, reasoning and adaptation); resilience and dependability (resilience vs. robustness, dependable vs. adaptive systems); verification, validation and evaluation of resilience; modeling and model based analysis of resilience properties; formal and semi-formal techniques for verification and validation; experimental evaluations of resilient systems; quantitative approaches to ensuring resilience; resilience prediction; cast studies and applications; empirical studies in the domain of resilient systems; methodologies adopted in industrial contexts; cloud computing and resilient service provisioning; resilience for data-driven systems (e.g., big data-based adaption and resilience); resilient cyber-physical systems and infrastructures; global aspects of resilience engineering: education, training and cooperation.

Navigating Change in Service Systems
Proceedings of the 6th GeoChina International Conference on Civil & Transportation Infrastructures: From Engineering to Smart & Green Life Cycle Solutions -- Nanchang, China, 2021
Resilience for All
Simulation, Modeling, and Intelligent Engineering
Disaster Resilience
Analysis and Design
An Introduction
Design and Analysis of Resilient Network Protocols
Resilience Engineering Perspectives, Volume 1
Sustainable + Resilient Design Systems
Resilient Structures and Infrastructure
Lifelines

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.

No person or place is immune from disasters or disaster-related losses. Infectious disease outbreaks, acts of terrorism, social unrest, or financial disasters in addition to natural hazards can all lead to large-scale consequences for the nation and its communities. Communities and the nation thus face difficult fiscal, social, cultural, and environmental choices about the best ways to ensure basic security and quality of life against hazards, deliberate attacks, and disasters. Beyond the unquantifiable costs of injury and loss of life from disasters, statistics for 2011 alone indicate economic damages from natural disasters in the United States exceeded $55 billion, with 14 events costing more than a billion dollars in damages each. One way to reduce the impacts of disasters on the nation and its communities is to invest in enhancing resilience--the ability to prepare and plan for, absorb, recover from and more successfully adapt to adverse events. Disaster Resilience: A National Imperative addresses the broad issue of increasing the nation's resilience to disasters. This book defines "national resilience", describes the state of knowledge about resilience to hazards and disasters, and frames the main issues related to increasing resilience in the United States. It also provide goals, baseline conditions, or performance metrics for national resilience and outlines additional information, data, gaps, and/or obstacles that need to be addressed to increase the nation's resilience to disasters. Additionally, the book's authoring committee makes recommendations about the necessary approaches to elevate national resilience to disasters in the United States. Enhanced resilience allows better anticipation of disasters and better planning to reduce disaster losses-rather than waiting for an event to occur and paying for it afterward. Disaster Resilience confronts the topic of how to increase the nation's resilience to disasters through a vision of the characteristics of a resilient nation in the year 2030. Increasing disaster resilience is an imperative that requires the collective will of the nation and its communities. Although disasters will continue to occur, actions that move the nation from reactive approaches to disasters to a proactive stance where communities actively engage in enhancing resilience will reduce many of the broad societal and economic burdens that disasters can cause.

MOP 144 provides guidance and underlying framework for creating consistency across hazards, systems, and sectors in the design of new infrastructure systems and in enhancing the resilience of existing ones.

Designing structures to be resilient to extreme loads has become a topic of interest in recent years, which has been triggered by the progressive collapse of structures in the past. Structural failure due to the lack of resilient design has been particularly prevalent in bridges. The failures have been results of a variety of factors that the bridges have been subjected to. The objective of preventing the occurrence of future collapses has encouraged further research into the design of resilient structures. Two main methods to design for resilience have been implemented in this thesis. These methods include the incorporation of robustness or redundancy into the bridge design. Each method is advantageous over the other in certain circumstances. These methods are both based on linear static analysis procedures. A series of 2D truss bridge models with varying parameters have been analyzed for their performance in damaged states. The damage incurred by the bridges include the removal of a pier and the removal of bridge members. The results of this investigation conclude that the cost of designing a bridge to be resilient is relatively low in comparison to the overall cost of the bridge. Robust bridge designs are generally more effective for bridges with longer spans, whereas designs with redundancy are better suited for shorter spans. As the amount of structural damage that is incurred by a bridge increases, the more redundancy should be built into the structure. These results were shared by all three of the truss topologies that were explored.

This volume contains state of the engineering practice and recent research in the field of built infrastructure and natural hazards. It is expected that the book will help engineers and researchers to design and built resilient infrastructures in challenging conditions (e.g., earthquakes and climate change) while optimising the design and minimising the future maintenance cost. In particular new design and construction techniques with reference to major infrastructure projects such as tunneling and transport infrastructure are discussed.

This book adopts a systematic view of the control systems in cyber-physical systems including the security control of the optimal control system, security control of the non-cooperative game system, quantify the impact of the Denial-of-Service attacks on the optimal control system, and the adaptive security control of the networked control systems. Because the cyber-physical system is a hybrid system, it adopts cross layer approach to handle the security control of the CPS. It presents a number of attack models according to the attack scenario and defense facilities, and a number of cross-layer co-design methodologies to secure the control of CPS.

In the United States, people of color are disproportionally more likely to live in environments with poor air quality, in close proximity to toxic waste, and in locations more vulnerable to climate change and extreme weather events. In many vulnerable neighborhoods, structural racism and classism prevent residents from having a seat at the table when decisions are made about their community. In an effort to overcome power imbalances and ensure local knowledge informs decision-making, a new approach to community engagement is essential. In Resilience for All, Barbara Brown Wilson looks at less conventional, but often more effective methods to make communities more resilient. She takes an in-depth look at what equitable, positive change through community-driven design looks like in four communities—East Biloxi, Mississippi; the Lower East Side of Manhattan; the Denby neighborhood in Detroit, Michigan; and the Cully neighborhood in Portland, Oregon. These vulnerable communities have prevailed in spite of serious urban stressors such as climate change, gentrification, and disinvestment. Wilson looks at how the lessons in the case studies and other examples might more broadly inform future practice. She shows how community-driven design projects in underserved neighborhoods can not only change the built world, but also provide opportunities for residents to build their own capacities.

Performance-Based Seismic Engineering: Vision for an Earthquake Resilient Society
Striving for Equity Through Community-Driven Design
Resilient Space Systems Design
Creating Businesses That Adapt and Flourish in a Changing World
Resilient Urban Futures
Overcoming Vulnerability for Competitive Advantage
Analysis and Design of a Cantilever-mounted Resilient-pad Gas-lubricated Thrust Bearing
Adaptive Design and Risk Management
Resilient by Design
Climate-Resilient Infrastructure
A Guidebook
A Game- and Decision-Theoretic Approach to Resilient Interdependent Network Analysis and Design

Services are prone to change in the form of expected and unexpected variations and disruptions, more so given the increasing interconnectedness and complexity of service systems today. These changes require service systems to be resilient and designed to adapt, to ensure that services continue to work smoothly. This thesis problematises the prevailing view and assumptions underpinning the current understanding of resilience in services. Drawing on literature from service management, service design, systems thinking and social-ecological resilience theory, this work investigates how service design can foster resilience in service systems. Supported by empirical input from three research projects in healthcare, the findings show service design can contribute to the adaptability and transformability of service systems through its holistic, human-centred, participatory and experimental approaches. Through the analysis, this research identifies key intervention points for cultivating service systems resilience through service design, including the design of service interactions, processes, enabling structures and multi-level governance. The study makes two important contributions. First, it extends

the understanding of service systems resilience as the collective capacity for intentional action in responding to ongoing change, coordinated across scales in order to create value. This is supported by offering alternative assumptions about resilience in service. Second, it positions service design as an enabler of service resilience by explicitly linking design practice(s) to processes that contribute to resilience. By extending the understanding of service systems resilience, this thesis lays the groundwork for future research at the intersection of service design, systemic change and resilience.
This book discusses resilience in terms of structures' and infrastructures' responses to extreme loading conditions. These include static and dynamic loads such as those generated by blasts, terrorist attacks, seismic events, impact loadings, progressive collapse, floods and wind. In the last decade, the concept of resilience and resilient-based structures has increasingly gained in interest among engineers and scientists. Resilience describes a given structure's ability to withstand sudden shocks. In other words, it can be measured by the magnitude of shock that a system can tolerate. This book offers a valuable resource for the development of new engineering practices, codes and regulations, public policy, and investigation reports on resilience, and provides broad and integrated coverage of the effects of dynamic loadings, and of the modeling techniques used to compute the structural response to these loadings.
This monograph is motivated by the challenges faced in designing reliable VLSI systems in modern VLSI processes. The reliable operation of integrated circuits (ICs) has become increasingly dif?cult to achieve in the deep submicron (DSM) era. With continuouslydecreasing device feature sizes, combinedwith lower supply voltages and higher operating frequencies, the noise immunity of VLSI circuits is decreasing alarmingly. Thus, VLSI circuits are becoming more vulnerable to noise effects such as crosstalk, power supply variations, and radiation-inducedsoft errors. Among these noise sources, soft errors(or error caused by radiation particle strikes) have become an increasingly troublesome issue for memory arrays as well as c- binational logic circuits. Also, in the DSM era, process variations are increasing at a signi?cant rate, making it more dif?cult to design reliable VLSI circuits. Hence, it is important to ef?ciently design robust VLSI circuits that are resilient to radiation particle strikes and process variations. The work presented in this research mo- graph presents several analysis and design techniques with the goal of realizing VLSI circuits, which are radiation and process variation tolerant.
This brief introduces game- and decision-theoretical techniques for the analysis and design of resilient interdependent networks. It unites game and decision theory with network science to lay a system-theoretical foundation for understanding the resiliency of interdependent and heterogeneous network systems. The authors pay particular attention to critical infrastructure systems, such as electric power, water, transportation, and communications. They discuss how infrastructure networks are becoming increasingly interconnected as the integration of Internet of Things devices, and how a single-point failure in one network can propagate to other infrastructures, creating an enormous social and economic impact. The specific topics in the book include: · static and dynamic meta-network resilience game analysis and design; · optimal control of interdependent epidemics spreading over complex networks; and · applications to secure and resilient design of critical infrastructures. These topics are supported by up-to-date summaries of the authors' recent research findings. The authors then discuss the future challenges and directions in the analysis and design of interdependent networks and explain the role of multi-disciplinary research has in computer science, engineering, public policy, and social sciences fields of study. The brief introduces new application areas in mathematics, economics, and system and control theory, and will be of interest to researchers and practitioners looking for new approaches to assess and mitigate risks in their systems and enhance their network resilience. A Game- and Decision-Theoretic Approach to Resilient Interdependent Network Analysis and Design also has self-contained chapters, which allows for multiple levels of reading by anyone with an interest in game and decision theory and network science.
Stories from Nokia, Dell, UPS, Toyota, and other companies show how firms can reduce their vulnerability to high-impact distributions, from earthquakes to strikes, from SARS to terrorism, and use them for competitive advantage. What happens when fire strikes the manufacturing plant of the sole supplier for the brake pressure valve used in every Toyota? When a hurricane shuts down production at a Unilever plant? When Dell and Apple chip manufacturers in Taiwan take weeks to recover from an earthquake? When the U.S. Pacific ports are shut down during the Christmas rush? When terrorists strike? In The Resilient Enterprise, Yossi Sheffi shows that companies' fortunes in the face of such business shocks depend more on choices made before the disruption than they do on actions taken in the midst of it—and that resilience benefits firms every day, disaster or no disaster. He shows how companies can build in flexibility throughout their supply chains, based on proven design principles and the right culture—balancing security, redundancy, and short-term profits. And he shows how investments in resilience and flexibility not only reduce risk but create a competitive advantage in the increasingly volatile marketplace.Sheffi describes the way companies can increase security—reducing the likelihood of a disruption—with layered defenses, the tracking and analysis of "near-misses," fast detection, and close collaboration with government agencies, trading partners, and even competitors. But the focus of the book is on resilience—the ability to bounce back from disruptions and disasters—by building in redundancy and flexibility. For example, standardization, modular design, and collaborative relationships with suppliers (and other stakeholders) can help create a robust supply chain. And a corporate culture of flexibility—with distributed decision making and communications at all levels—can create a resilient enterprise.Sheffi provides tools for companies to reduce the vulnerability of the supply chain they live in. And along the way he tells the stories of dozens of enterprises, large and small, including Toyota, Nokia, General Motors, Zara, Land Rover, Chiquita, Aisin Seiki, Southwest Airlines, UPS, Johnson and Johnson, Intel, Amazon.com, the U.S. Navy, and others, from across the globe. Their successes, failures, preparations, and methods provide a rich set of lessons in preparing for and managing disruptions. Additional material available at www.TheResilientEnterprise.com.
This book focuses on the role of systems and control. Focusing on the current and future development of smart grids in the generation and transmission of energy, it provides an overview of the smart grid control landscape, and the potential impact of the various investigations presented has for technical aspects of power generation and distribution as well as for human and economic concerns such as pricing, consumption and demand management. A tutorial exposition is provided in each chapter, describing the opportunities and challenges that lie ahead. Topics in these chapters include: wide-area control; issues of estimation and integration at the transmission; distribution, consumers, and demand management; and cyber-physical security for smart grid control systems. The contributors describe the problems involved with each topic, and what impact these problems would have if not solved. The tutorial components and the opportunities and challenges detailed make this book ideal for anyone interested in new paradigms for modernized, smart power grids, and anyone in a field where control is applied. More specifically, it is a valuable resource for students studying smart grid control, and for researchers and academics wishing to extend their knowledge of the topic.
MOP 140 provides guidance for developing or enhancing of methods for infrastructure analysis and design to achieve infrastructure resilience targets while minimizing life-cycle costs in a changing climate.

The 2012 National Research Council report Disaster Resilience: A National Imperative highlighted the challenges of increasing national resilience in the United States. One finding of the report was that "without numerical means of assessing resilience, it would be impossible to identify the priority needs for improvement, to monitor changes, to show that resilience had improved, or to compare the benefits of increasing resilience with the associated costs." Although measuring resilience is a challenge, metrics and indicators to evaluate progress, and the data necessary to establish the metric, are critical for helping communities to clarify and formalize what the concept of resilience means for them, and to support efforts to develop and prioritize resilience investments. One of the recommendations from the 2012 report stated that government entities at federal, state, and local levels and professional organizations should partner to help develop a framework for communities to adapt to their circumstances and begin to track their progress toward increasing resilience. To build upon this recommendation and begin to help communities formulate such a framework, the Resilient America Roundtable of the National Academies convened the workshop Measures of Community Resilience: From Lessons Learned to Lessons Applied on September 5, 2014 in Washington, D.C. The workshop's overarching objective was to begin to develop a framework of measures and indicators that could support community efforts to increase their resilience. The framework will be further developed through feedback and testing in pilot and other partner communities that are working with the Resilient America Roundtable. This report is a summary of the one-day workshop, which consisted of a keynote address and two panel sessions in the morning and afternoon breakout sessions that began the discussion on how to develop a framework of resilience measures.
Structures of Coastal Resilience presents new strategies for creative and collaborative approaches to coastal planning for climate change. In the face of sea level rise and an increased risk of flooding from storm surge, we must become less dependent on traditional approaches to flood control that have relied on levees, sea walls, and other forms of hard infrastructure. Instead, authors Catherine Seavitt Nordenson, Guy Nordenson, and Julia Chapman reimagine how coastal planning might better serve communities grappling with a future of uncertain environmental change. They offer inspiring insights into new approaches to design, engineering, and planning, envisioning an ecological approach to developing adaptive and resilient futures for coastal areas.
This book constitutes the refereed proceedings of the 6th International Workshop on Software Engineering for Resilient Systems, SERENE 2014, held in Budapest, Hungary, in October 2014. The 11 revised technical papers presented together with one project paper and one invited talk were carefully reviewed and selected from 22 submissions. The papers are organized in topical sections on design of resilient systems; analysis of resilience; verification and validation; and monitoring.
The main goal of this project is to establish a fundamental analytical and design framework for highly resilient wireless and sensor networks based on the study of the qualitative and quantitative properties of the largest connected component. Building on our recent promising results in the field of percolation, we propose to design network structures and algorithms to greatly enhance the resilience of high-performance wireless and sensor networks within challenging and dynamic environments. This proposed effort involves further enhancing our understanding of percolation processes and phase transition in networks with general spatial node distributions, multiple transmission power levels, and channel fading. It also involves analysis of network resilience to correlated and cascading node failures, investigating resilience in mobile networks, and developing distributed control algorithms to achieve network resilience using limited communication overhead. Major accomplishments over the period covered by the grant fall into three general areas: 1) improvement of the analytical characterization of the critical threshold for general random geometric graphs with heterogeneous transmission power levels and channel fading, 2) new analysis of the resilience to correlated and cascading node failures in wireless networks, and 3) new analysis of percolation processes in mobile wireless networks, and characterization of the latency for information dissemination in mobile wireless networks.
This brief introduces game- and decision-theoretical techniques for the analysis and design of resilient interdependent networks. It unites game and decision theory with network science to lay a system-theoretical foundation for understanding the resiliency of interdependent and heterogeneous network systems. The authors pay particular attention to critical infrastructure systems, such as electric power, water, transportation, and communications. They discuss how infrastructure networks are becoming increasingly interconnected as the integration of Internet of Things devices, and how a single-point failure in one network can propagate to other infrastructures, creating an enormous social and economic impact. The specific topics in the book include: · static and dynamic meta-network resilience game analysis and design; · optimal control of interdependent epidemics spreading over complex networks; and · applications to secure and resilient design of critical infrastructures. These topics are supported by up-to-date summaries of the authors' recent research findings. The authors then discuss the future challenges and directions in the analysis and design of interdependent networks and explain the role of multi-disciplinary research has in computer science, engineering, public policy, and social sciences fields of study. The brief introduces new application areas in mathematics, economics, and system and control theory, and will be of interest to researchers and practitioners looking for new approaches to assess and mitigate risks in their systems and enhance their network resilience. A Game- and Decision-Theoretic Approach to Resilient Interdependent Network Analysis and Design also has self-contained chapters, which allows for multiple levels of reading by anyone with an interest in game and decision theory and network science.
Resilience engineering has since 2004 attracted widespread interest from industry as well as academia. Practitioners from various fields, such as aviation and air traffic management, patient safety, off-shore exploration and production, have quickly realised the potential of resilience engineering and have became early adopters. The continued development of resilience engineering has focused on four abilities that are essential for resilience. These are the ability a) to respond to what happens, b) to monitor critical developments, c) to anticipate future threats and opportunities, and d) to learn from past experience - successes as well as failures. Working with the four abilities provides a structured way of analysing problems and issues, as well as of proposing practical solutions (concepts, tools, and methods). This book is divided into four main sections which describe issues relating to each of the four abilities. The chapters in each section emphasise practical ways of engineering resilience and feature case studies and real applications. The text is written to be easily accessible for readers who are more interested in solutions than in research, but will also be of interest to the latter group.