# HARDWARE SECURITY
## Design, Threats, and Safeguards

Debdeep Mukhopadhyay
Rajat Subhra Chakraborty

# Hardware Security Design Threats And Safeguards

Swarup Bhunia,Mark M. Tehranipoor

**Hardware Security Design Threats And Safeguards:**

   **Hardware Security** Debdeep Mukhopadhyay,Rajat Subhra Chakraborty,2014-10-29 Design for security and meet real time requirements with this must have book covering basic theory hardware design and implementation of cryptographic algorithms and side channel analysis Presenting state of the art research and strategies for the design of very large scale integrated circuits and symmetric cryptosystems the text discusses hardware intellectual property protection obfuscation and physically unclonable functions Trojan threats and algorithmic and circuit level countermeasures for attacks based on power timing fault cache and scan chain analysis Gain a comprehensive understanding of hardware security from fundamentals to practical applications    *Hardware Security* Debdeep Mukhopadhyay,Rajat Subhra Chakraborty,2014-10-29 Design for security and meet real time requirements with this must have book covering basic theory hardware design and implementation of cryptographic algorithms and side channel analysis Presenting state of the art research and strategies for the design of very large scale integrated circuits and symmetric cryptosystems the text discusses hardware intellectual property protection obfuscation and physically unclonable functions Trojan threats and algorithmic and circuit level countermeasures for attacks based on power timing fault cache and scan chain analysis Gain a comprehensive understanding of hardware security from fundamentals to practical applications    Split Manufacturing of Integrated Circuits for Hardware Security and Trust Ranga Vemuri,Suyuan Chen,2021-05-25 Globalization of the integrated circuit IC supply chains led to many potential vulnerabilities Several attack scenarios can exploit these vulnerabilities to reverse engineer IC designs or to insert malicious trojan circuits Split manufacturing refers to the process of splitting an IC design into multiple parts and fabricating these parts at two or more foundries such that the design is secure even when some or all of those foundries are potentially untrusted Realizing its security benefits researchers have proposed split fabrication methods for 2D 2 5D and the emerging 3D ICs Both attack methods against split designs and defense techniques to thwart those attacks while minimizing overheads have steadily progressed over the past decade This book presents a comprehensive review of the state of the art and emerging directions in design splitting for secure split fabrication design recognition and recovery attacks against split designs and design techniques to defend against those attacks Readers will learn methodologies for secure and trusted IC design and fabrication using split design methods to protect against supply chain vulnerabilities    Fault Tolerant Architectures for Cryptography and Hardware Security SIKHAR PATRANABIS,Debdeep Mukhopadhyay,2018-03-29 This book uses motivating examples and real life attack scenarios to introduce readers to the general concept of fault attacks in cryptography It offers insights into how the fault tolerance theories developed in the book can actually be implemented with a particular focus on a wide spectrum of fault models and practical fault injection techniques ranging from simple low cost techniques to high end equipment based methods It then individually examines fault attack vulnerabilities in symmetric asymmetric and authenticated encryption systems This is followed by extensive coverage of countermeasure techniques and

fault tolerant architectures that attempt to thwart such vulnerabilities Lastly it presents a case study of a comprehensive FPGA based fault tolerant architecture for AES 128 which brings together of a number of the fault tolerance techniques presented It concludes with a discussion on how fault tolerance can be combined with side channel security to achieve protection against implementation based attacks The text is supported by illustrative diagrams algorithms tables and diagrams presenting real world experimental results **Security in Computing and Communications** Jemal H. Abawajy,Sougata Mukherjea,Sabu M. Thampi,Antonio Ruiz-Martínez,2015-08-07 This book constitutes the refereed proceedings of the International Symposium on Security in Computing and Communications SSCC 2015 held in Kochi India in August 2015 The 36 revised full papers presented together with 13 short papers were carefully reviewed and selected from 157 submissions The papers are organized in topical sections on security in cloud computing authentication and access control systems cryptography and steganography system and network security application security Fundamentals of IP and SoC Security Swarup Bhunia,Sandip Ray,Susmita Sur-Kolay,2017-01-24 This book is about security in embedded systems and it provides an authoritative reference to all aspects of security in system on chip SoC designs The authors discuss issues ranging from security requirements in SoC designs definition of architectures and design choices to enforce and validate security policies and trade offs and conflicts involving security functionality and debug requirements Coverage also includes case studies from the trenches of current industrial practice in design implementation and validation of security critical embedded systems Provides an authoritative reference and summary of the current state of the art in security for embedded systems hardware IPs and SoC designs Takes a cross cutting view of security that interacts with different design and validation components such as architecture implementation verification and debug each enforcing unique trade offs Includes high level overview detailed analysis on implementation and relevant case studies on design verification debug issues related to IP SoC security **Formal Techniques for Safety-Critical Systems** Cyrille Artho,Peter Csaba Ölveczky,2017-02-15 This book constitutes the refereed proceedings of the 5th International Workshop on Formal Techniques for Safety Critical Systems FTSCS 2016 held in Tokyo Japan in November 2016 The 9 revised full papers presented together with an abstract of an invited talk were carefully reviewed and selected from 23 submissions The papers are organized in topical sections on specification and verification automotive and railway systems circuits and cyber physical systems parametrized verification *Encyclopedia of Cryptography, Security and Privacy* Sushil Jajodia,Pierangela Samarati,Moti Yung,2025-01-10 A rich stream of papers and many good books have been written on cryptography security and privacy but most of them assume a scholarly reader who has the time to start at the beginning and work his way through the entire text The goal of Encyclopedia of Cryptography Security and Privacy Third Edition is to make important notions of cryptography security and privacy accessible to readers who have an interest in a particular concept related to these areas but who lack the time to study one of the many books in these areas The third edition is intended as a replacement of Encyclopedia of Cryptography

and Security Second Edition that was edited by Henk van Tilborg and Sushil Jajodia and published by Springer in 2011 The goal of the third edition is to enhance on the earlier edition in several important and interesting ways First entries in the second edition have been updated when needed to keep pace with the advancement of state of the art Second as noticeable already from the title of the encyclopedia coverage has been expanded with special emphasis to the area of privacy Third considering the fast pace at which information and communication technology is evolving and has evolved drastically since the last edition entries have been expanded to provide comprehensive view and include coverage of several newer topics

**Security, Privacy, and Applied Cryptography Engineering** Sk Subidh Ali,Jean-Luc Danger,Thomas Eisenbarth,2017-11-27 This book constitutes the refereed proceedings of the 7th International Conference on Security Privacy and Applied Cryptography Engineering SPACE 2017 held in Goa India in December 2017 The 13 revised full papers presented together with 1 short paper 7 invited talks and 4 tutorials were carefully reviewed and selected from 49 initial submissions This annual event is devoted to various aspects of security privacy applied cryptography and cryptographic engineering This is indeed a very challenging field requiring the expertise from diverse domains ranging from mathematics to solid state circuit design     Secure System Design and Trustable Computing Chip-Hong Chang,Miodrag Potkonjak,2015-09-17 This book provides the foundations for understanding hardware security and trust which have become major concerns for national security over the past decade Coverage includes issues related to security and trust in a variety of electronic devices and systems related to the security of hardware firmware and software spanning system applications online transactions and networking services This serves as an invaluable reference to the state of the art research that is of critical significance to the security of and trust in modern society s microelectronic supported infrastructures     *Security Opportunities in Nano Devices and Emerging Technologies* Mark Tehranipoor,Domenic Forte,Garrett Rose,Swarup Bhunia,2017-11-22 The research community lacks both the capability to explain the effectiveness of existing techniques and the metrics to predict the security properties and vulnerabilities of the next generation of nano devices and systems This book provides in depth viewpoints on security issues and explains how nano devices and their unique properties can address the opportunities and challenges of the security community manufacturers system integrators and end users This book elevates security as a fundamental design parameter transforming the way new nano devices are developed Part 1 focuses on nano devices and building security primitives Part 2 focuses on emerging technologies and integrations     *Hardware Security* Swarup Bhunia,Mark M. Tehranipoor,2018-10-30 Hardware Security A Hands On Learning Approach provides a broad comprehensive and practical overview of hardware security that encompasses all levels of the electronic hardware infrastructure It covers basic concepts like advanced attack techniques and countermeasures that are illustrated through theory case studies and well designed hands on laboratory exercises for each key concept The book is ideal as a textbook for upper level undergraduate students studying computer engineering computer science electrical engineering and biomedical

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nonlinearity ease of heterogeneous integration and tamper resilience to the corresponding security primitives that they help realize such as static and dynamic camouflaging true random number generation physically unclonable functions secure heterogeneous and large scale systems and tamper proof memories The authors discuss several device technologies offering the desired properties including spintronics switches memristors silicon nanowire transistors and ferroelectric devices for such security primitives and schemes while also providing a detailed case study for each of the outlined security applications Overall the book gives a holistic perspective of how the promising properties found in emerging devices which are not readily afforded by traditional CMOS devices and systems can help advance the field of hardware security **Experiencing MIS** David Kroenke,Deborah Bunker,David Wilson,2013-09-20 Real World Lessons Excellent Support Whatever you do in business you will experience MIS What kind of experience will you have with MIS Will you understand how businesses use and need information systems to accomplish their goals and objectives and develop their competitive strategy By presenting real world cases Experiencing MIS helps you to experience MIS right now at university where you can exercise your enquiring mind and unlock the potential of information systems for business With an approachable easy to use and sometimes humorous attitude this text shows you how to become a better problem solver and a valued business professional **Security and Privacy in the Internet of Things** Ali Ismail Awad,Jemal Abawajy,2021-12-29 SECURITY AND PRIVACY IN THE INTERNET OF THINGS Provides the authoritative and up to date information required for securing IoT architecture and applications The vast amount of data generated by the Internet of Things IoT has made information and cyber security vital for not only personal privacy but also for the sustainability of the IoT itself Security and Privacy in the Internet of Things brings together high quality research on IoT security models architectures techniques and application domains This concise yet comprehensive volume explores state of the art mitigations in IoT security while addressing important security and privacy challenges across different IoT layers The book provides timely coverage of IoT architecture security technologies and mechanisms and applications The authors outline emerging trends in IoT security and privacy with a focus on areas such as smart environments and e health Topics include authentication and access control attack detection and prevention securing IoT through traffic modeling human aspects in IoT security and IoT hardware security Presenting the current body of knowledge in a single volume Security and Privacy in the Internet of Things Discusses a broad range of IoT attacks and defense mechanisms Examines IoT security and privacy protocols and approaches Covers both the logical and physical security of IoT devices Addresses IoT security through network traffic modeling Describes privacy preserving techniques in smart cities Explores current threat and vulnerability analyses Security and Privacy in the Internet of Things Architectures Techniques and Applications is essential reading for researchers industry practitioners and students involved in IoT security development and IoT systems deployment **Network Security, Firewalls and VPNs** J. Michael Stewart,2013-07-11 This fully revised and updated second edition provides a unique in depth look at the major business challenges and threats that

are introduced when an organization s network is connected to the public Internet It provides a comprehensive explanation of network security basics including how hackers access online networks and the use of Firewalls and VPNs to provide security countermeasures Using examples and exercises this book incorporates hands on activities to prepare the reader to disarm threats and prepare for emerging technologies and future attacks Topics covered include the basics of network security exploring the details of firewall security and how VPNs operate how to plan proper network security to combat hackers and outside threats firewall configuration and deployment and managing firewall security and how to secure local and internet communications with a VP      *Design and Deploy Microsoft Defender for IoT* Puthiyavan Udayakumar,Dr. R. Anandan,2024-05-15 Microsoft Defender for IoT helps organizations identify and respond to threats aimed at IoT devices increasingly becoming targets for cyberattacks This book discusses planning deploying and managing your Defender for IoT system The book is a comprehensive guide to IoT security addressing the challenges and best practices for securing IoT ecosystems The book starts with an introduction and overview of IoT in Azure It then discusses IoT architecture and gives you an overview of Microsoft Defender You also will learn how to plan and work with Microsoft Defender for IoT followed by deploying OT Monitoring You will go through air gapped OT sensor management and enterprise IoT monitoring You also will learn how to manage and monitor your Defender for IoT systems with network alerts and data After reading this book you will be able to enhance your skills with a broader understanding of IoT and Microsoft Defender for IoT integrated best practices to design deploy and manage a secure enterprise IoT environment using Azure What You Will Learn Understand Microsoft security services for IoT Get started with Microsoft Defender for IoT Plan and design a security operations strategy for the IoT environment Deploy security operations for the IoT environment Manage and monitor your Defender for IoT System Who This Book Is For Cybersecurity architects and IoT engineers      *A National Plan for Energy Research, Development & Demonstration* United States. Energy Research and Development Administration,      *A National Plan for Energy Research, Development & Demonstration: Program implementation* United States. Energy Research and Development Administration,1976

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