



Stefan Achleitner

# Differential Power-Analysis Attacks

A Practical Example for Hardware  
Countermeasures Protecting Cryptographic  
Circuits

# Differential Power Analysis Attacks A Practical Example For Hardware Countermeasures Protecting Cryptographic Circuits

**Marc Joye, Abderrahmane Nitaj**



## **Differential Power Analysis Attacks A Practical Example For Hardware Countermeasures Protecting Cryptographic Circuits:**

**Differential Power-Analysis Attacks** Stefan Achleitner, 2008      Software Defined Chips Leibo Liu, Shaojun Wei, Jianfeng Zhu, Chenchen Deng, 2022-11-14 This book is the second volume of a two volume book set which introduces software defined chips In this book the programming model of the software defined chips is analyzed by tracing the coevolution of modern general purpose processors and programming models The enhancement in hardware security and reliability of the software defined chips are described from the perspective of dynamic and partial reconfiguration The challenges and prospective trends of software defined chips are also discussed Current applications in the fields of artificial intelligence cryptography 5G communications etc are presented in detail Potential applications in the future including post quantum cryptography evolutionary computing etc are also discussed This book is suitable for scientists and researchers in the areas of electrical and electronic engineering and computer science Postgraduate students practitioners and professionals in related areas are also potentially interested in the topic of this book      Cryptographic Hardware and Embedded Systems - CHES 2009 Christophe Clavier, Kris Gaj, 2009-08-28 CHES 2009 the 11th workshop on Cryptographic Hardware and Embedded Systems was held in Lausanne Switzerland September 6 9 2009 The workshop was sponsored by the International Association for Cryptologic Research IACR The workshop attracted a record number of 148 submissions from 29 countries of which the Program Committee selected 29 for publication in the workshop proceedings resulting in an acceptance rate of 19.6% the lowest in the history of CHES The review process followed strict standards each paper received at least four reviews and some as many as eight reviews Members of the Program Committee were restricted to co-authoring at most two submissions and their papers were evaluated by an extended number of reviewers The Program Committee included 53 members representing 20 countries and five continents These members were carefully selected to represent academia industry and government as well as to include world class experts in various research fields of interest to CHES The Program Committee was supported by 148 external reviewers The total number of people contributing to the review process including Program Committee members external reviewers and Program Co-chairs exceeded 200 The papers collected in this volume represent cutting edge worldwide research in the rapidly growing and evolving area of cryptographic engineering

**Cryptographic Hardware and Embedded Systems - CHES 2006** Louis Goubin, Mitsuru Matsui, 2006-10-17 This book constitutes the refereed proceedings of the 8th International Workshop on Cryptographic Hardware and Embedded Systems CHES 2006 held in Yokohama Japan in October 2006 The 32 revised full papers presented together with three invited talks were carefully reviewed and selected from 112 submissions      **ISSE 2006 Securing Electronic Business Processes** Sachar Paulus, Norbert Pohlmann, Helmut Reimer, 2007-12-22 This book presents the most interesting talks given at ISSE 2006 the forum for the interdisciplinary discussion of how to adequately secure electronic business processes The topics

include Smart Token and e ID Card Developments and their Application Secure Computing and how it will change the way we trust computers Risk Management and how to quantify security threats Awareness raising Data Protection and how we secure corporate information Adequate information security is one of the basic requirements of all electronic business processes It is crucial for effective solutions that the possibilities offered by security technology can be integrated with the commercial requirements of the applications The reader may expect state of the art best papers of the Conference ISSE 2006

Progress in Cryptology - AFRICACRYPT 2017 Marc Joye, Abderrahmane Nitaj, 2017-05-10 This book constitutes the refereed proceedings of the 9th International Conference on the Theory and Application of Cryptographic Techniques in Africa AFRICACRYPT 2017 held in Dakar Senegal in May 2017 The 13 papers presented in this book were carefully reviewed and selected from 40 submissions The papers are organized in topical sections on cryptographic schemes side channel analysis differential cryptanalysis applications and number theory

Advances in Information Security and Assurance James (Jong Hyuk) Park, Hsiao-Hwa Chen, Mohammed Atiquzzaman, Changhoon Lee, Sang-Soo Yeo, 2009-06-09 This book constitutes the refereed proceedings of the Third International Conference on Advances in Information Security and Its Applications ISA 2009 held in Seoul Korea in June 2009 The 41 revised full papers presented were carefully reviewed and selected from 137 submissions The papers are organized in topical sections on cryptographic algorithms authentication and identity management authorization and access control biometrics and computer forensics cryptographic protocols data integrity and privacy key management and recovery mobile and RFID network security firewall IDs anti virus and other security products internet and web services security cyber attack and cyber terrorism other security research together with the articles from the workshops MoWiN 2009 NASSUE 2009 IAWSN 2009 WNGS 2009 CGMS 2009 SHCI ISA 2009

**IEEE/ACM/IFIP International Conference on Hardware/Software Codesign & System Synthesis**, 2005 *Security in RFID and Sensor Networks* Paris Kitsos, 2016-04-19 In the past several years there has been an increasing trend in the use of Radio Frequency Identification RFID and Wireless Sensor Networks WSNs as well as in the integration of both systems due to their complementary nature flexible combination and the demand for ubiquitous computing As always adequate security remains one of the open are

**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 engineering but is also a handy reference for graduate students researchers and industry professionals For academic courses the book contains a robust suite of teaching ancillaries Users will be able to access schematic layout and design files for a printed circuit board for hardware hacking i e the HaHa board that can be

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*Cryptographic Hardware and Embedded Systems - CHES 2008* Elisabeth Oswald,2008-07-18 by Andrey Bogdanov Thomas Eisenbarth Andy Rupp and Christopher Wolf The purpose of the award is to formally acknowledge excellence in research We would like to congratulate the authors of these two papers

**Integrated Circuit and System Design. Power and Timing Modeling, Optimization and Simulation** Nadine Azemard,2007-08-21 This volume features the refereed proceedings of the 17th International Workshop on Power and Timing Modeling Optimization and Simulation Papers cover high level design low power design techniques low power analog circuits statistical static timing analysis power modeling and optimization low power routing optimization security and asynchronous design low power applications modeling and optimization and more

**Design Automation of Real-Life Asynchronous Devices and Systems** Alexander Taubin,Jordi Cortadella,Luciano Lavagno,2007 The number of gates on a chip is quickly growing toward and beyond the one billion mark Keeping all the gates running at the beat of a single or a few rationally related clocks is becoming impossible In static timing analysis process variations and signal integrity issues stretch the timing margins to the point where they become too conservative and result in significant overdesign Importance and difficulty of such problems push some developers to once again turn to asynchronous alternatives However the electronics industry for the most part is still reluctant to adopt asynchronous design with a few notable exceptions due to a common belief that we still lack a commercial quality Electronic Design Automation tools similar to the synchronous RTL to GDSII flow for asynchronous circuits The purpose of this paper is to counteract this view by presenting design flows that can tackle large designs without significant changes with respect to synchronous design flow We are limiting ourselves to four design flows that we believe to be closest to this goal We start from the Tangram flow because it is the most commercially proven and it is one of the oldest from a methodological point of view The other three flows Null Convention Logic de synchronization and gate level pipelining could be considered together as asynchronous re implementations of synchronous RTL or gate level specifications The main common idea is substituting the global clocks by local synchronizations Their most important aspect is to open the possibility to implement large legacy synchronous designs in an almost push button manner where all asynchronous machinery is hidden so that synchronous RTL designers do not need to be re educated These three flows offer a trade off from very low overhead almost synchronous

implementations to very high performance extremely robust dual rail pipelines      *Encyclopedia of Computer Science and Technology, Second Edition (Set)* Phillip A. Laplante, 2017-10-02 With breadth and depth of coverage the Encyclopedia of Computer Science and Technology Second Edition has a multi disciplinary scope drawing together comprehensive coverage of the inter related aspects of computer science and technology The topics covered in this encyclopedia include General and reference Hardware Computer systems organization Networks Software and its engineering Theory of computation Mathematics of computing Information systems Security and privacy Human centered computing Computing methodologies Applied computing Professional issues Leading figures in the history of computer science The encyclopedia is structured according to the ACM Computing Classification System CCS first published in 1988 but subsequently revised in 2012 This classification system is the most comprehensive and is considered the de facto ontological framework for the computing field The encyclopedia brings together the information and historical context that students practicing professionals researchers and academicians need to have a strong and solid foundation in all aspects of computer science and technology

**Constructive Side-Channel Analysis and Secure Design** Elif Bilge Kavun, Michael Pehl, 2023-03-22 This book constitutes the refereed proceedings of the 14th International Workshop on Constructive Side Channel Analysis and Secure Design COSADE 2023 held in Munich Germany during April 3 4 2023 The 12 full papers included in this book were carefully reviewed and selected from 28 submissions They were organized in topical sections as follows fault injection analyses and countermeasures side channel analyses and countermeasures attacks on PQC and countermeasure and analyses and tools

**Hardware Supply Chain Security** Basel Halak, 2021-02-04 This book presents a new threat modelling approach that specifically targets the hardware supply chain covering security risks throughout the lifecycle of an electronic system The authors present a case study on a new type of security attack which combines two forms of attack mechanisms from two different stages of the IC supply chain More specifically this attack targets the newly developed light cipher Ascon and demonstrates how it can be broken easily when its implementation is compromised with a hardware Trojan This book also discusses emerging countermeasures including anti counterfeit design techniques for resources constrained devices and anomaly detection methods for embedded systems      Handbook of FPGA Design Security Ted Huffmire, Cynthia Irvine, Thuy D. Nguyen, Timothy Levin, Ryan Kastner, Timothy Sherwood, 2010-06-18 The purpose of this book is to provide a practical approach to managing security in FPGA designs for researchers and practitioners in the electronic design automation EDA and FPGA communities including corporations industrial and government research labs and academics This book combines theoretical underpinnings with a practical design approach and worked examples for combating real world threats To address the spectrum of lifecycle and operational threats against FPGA systems a holistic view of FPGA security is presented from formal top level specification to low level policy enforcement mechanisms which integrates recent advances in the fields of computer security theory languages compilers and hardware The net effect is a diverse set of static and runtime

techniques that working in cooperation facilitate the composition of robust dependable and trustworthy systems using commodity components We wish to acknowledge the many people who helped us ensure the success of our work on reconfigurable hardware security In particular we wish to thank Andrei Paun and Jason Smith of Louisiana Tech University for providing us with a Linux compatible version of Grail We also wish to thank those who gave us comments on drafts of this book including Marco Platzner of the University of Paderborn and Ali Irturk and Jason Oberg of the University of California San Diego This research was funded in part by National Science Foundation Grant CNS 0524771 and NSF Career Grant CCF 0448654

**CODES+ISSS ,2005      *Ambient Intelligence: Impact on Embedded System Design* Twan Basten, Marc**

Geilen, Harmke de Groot, 2007-05-08 Hugo de Man Professor Katholieke Universiteit Leuven Senior Research Fellow IMEC The steady evolution of hardware software and communications technology is rapidly transforming the PC and dot.com world into the world of Ambient Intelligence AmI This next wave of information technology is fundamentally different in that it makes distributed wired and wireless computing and communication disappear to the background and puts users to the foreground AmI adapts to people instead of the other way around It will augment our consciousness monitor our health and security guide us through traffic etc In short its ultimate goal is to improve the quality of our life by a quiet reliable and secure interaction with our social and material environment What makes AmI engineering so fascinating is that its design starts from studying person to world interactions that need to be implemented as an intelligent and autonomous interplay of virtually all necessary networked electronic intelligence on the globe This is a new and exciting dimension for most electrical and software engineers and may attract more creative talent to engineering than pure technology does Development of the leading technology for AmI will only succeed if the engineering research community is prepared to join forces in order to make Mark Weiser's dream of 1991 come true This will not be business as usual by just doubling transistor count or clock speed in a microprocessor or increasing the bandwidth of communication      *Computational Intelligence in Information Assurance and Security* Ajith Abraham, 2007-05-02 This volume provides the academic and industrial community with a medium for presenting original research and applications related to information assurance and security using computational intelligence techniques It details current research on information assurance and security regarding both the theoretical and methodological aspects as well as various applications in solving real world problems using computational intelligence

## **Differential Power Analysis Attacks A Practical Example For Hardware Countermeasures Protecting Cryptographic Circuits** Book Review: Unveiling the Magic of Language

In an electronic digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Differential Power Analysis Attacks A Practical Example For Hardware Countermeasures Protecting Cryptographic Circuits**," written by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound effect on our existence. Throughout this critique, we shall delve to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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