

*Commenced Publication in 1973*

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

David Hutchison

*Lancaster University, UK*

Takeo Kanade

*Carnegie Mellon University, Pittsburgh, PA, USA*

Josef Kittler

*University of Surrey, Guildford, UK*

Jon M. Kleinberg

*Cornell University, Ithaca, NY, USA*

Alfred Kobsa

*University of California, Irvine, CA, USA*

Friedemann Mattern

*ETH Zurich, Switzerland*

John C. Mitchell

*Stanford University, CA, USA*

Moni Naor

*Weizmann Institute of Science, Rehovot, Israel*

Oscar Nierstrasz

*University of Bern, Switzerland*

C. Pandu Rangan

*Indian Institute of Technology, Madras, India*

Bernhard Steffen

*TU Dortmund University, Germany*

Madhu Sudan

*Microsoft Research, Cambridge, MA, USA*

Demetri Terzopoulos

*University of California, Los Angeles, CA, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Gerhard Weikum

*Max Planck Institute for Informatics, Saarbruecken, Germany*

Bart De Decker Jana Dittmann  
Christian Kraetzer Claus Vielhauer (Eds.)

# Communications and Multimedia Security

14th IFIP TC 6/TC 11 International Conference, CMS 2013  
Magdeburg, Germany, September 25-26, 2013  
Proceedings

## Volume Editors

Bart De Decker

KU Leuven, Department of Computer Science, iMinds-DistriNet

Celestijnenlaan 200A, 3001 Leuven, Belgium

E-mail: bart.dedecker@cs.kuleuven.be

Jana Dittmann

Otto-von-Guericke-Universität Magdeburg

Universitätsplatz 2, 39106 Magdeburg, Germany

E-mail: jana.dittmann@iti.cs.uni-magdeburg.de

Christian Kraetzer

Otto-von-Guericke-Universität Magdeburg

Universitätsplatz 2, 39106 Magdeburg, Germany

E-mail: kraetzer@iti.cs.uni-magdeburg.de

Claus Vielhauer

Fachhochschule Brandenburg/Otto-von-Guericke-Universität Magdeburg

Magdeburger Str. 50, 14770 Brandenburg, Germany

E-mail: claus.vielhauer@fh-brandenburg.de

ISSN 0302-9743

e-ISSN 1611-3349

ISBN 978-3-642-40778-9

e-ISBN 978-3-642-40779-6

DOI 10.1007/978-3-642-40779-6

Springer Heidelberg New York Dordrecht London

Library of Congress Control Number: : 2013946793

CR Subject Classification (1998): K.4.4, E.3, C.2.0, C.2, K.6.5, J.1, H.4

LNCS Sublibrary: SL 4– Security and Cryptology

© IFIP International Federation for Information Processing 2013

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

*Typesetting:* Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

# Preface

It is with great pleasure that we present the proceedings of the 14th IFIP TC-6 and TC-11 Conference on Communications and Multimedia Security (CMS 2013), which was held in Magdeburg, Germany during September 25–26, 2013. The meeting continues the tradition of previous CMS conferences which were held in Canterbury, UK (2012), Ghent, Belgium (2011) and Linz, Austria (2010).

The Program Committee (PC) received 30 submissions, comprising 23 full papers, 6 short papers and 1 extended abstract, out of which only 5 full papers were accepted (22% acceptance rate). In this edition, we have included 11 short papers, which describe valuable work-in-progress, as well as 5 extended abstracts, which describe the posters that were discussed at the conference. Some of the latter two categories are shortened versions of original full or short paper submissions respectively, which the PC judged to be valuable contributions but somewhat premature for submission under their original category.

We are grateful to Prof. Sabah Jassim of the University of Buckingham, UK and Prof. Sachar Paulus of the Brandenburg University of Applied Sciences, Brandenburg, Germany for accepting our invitations to deliver keynote addresses, the abstracts of which can be found at the end of these proceedings.

We would also like to say a word of appreciation to our sponsor: The Advanced Multimedia and Security Lab (AMSL) of the Otto-von-Guericke University of Magdeburg. Without its financial support, it would not have been possible to attract as many young researchers.

Finally, special thanks go to the organizing committee who handled all local organizational issues and provided us with a comfortable and inspiring location and an interesting evening event. For us, it was a distinct pleasure to serve as program chairs of CMS 2013.

We hope that you will enjoy reading these proceedings and that they may inspire you for future research in communications and multimedia security.

September 2013

Bart De Decker  
Jana Dittmann  
Claus Vielhauer

# Organization

CMS 2013 is the 14th Joint IFIP TC6 and TC11 Conference on Communications and Multimedia Security. It has been organized by the Otto-von-Guericke University of Magdeburg, Germany.

## Executive Committee

### Conference Chair

Claus Vielhauer

Brandenburg University of  
Applied Sciences, Germany

### Program Co-Chairs

Bart De Decker

KU Leuven, Belgium

Jana Dittmann

Otto-von-Guericke University Magdeburg,  
Germany

Claus Vielhauer

### Organizing Chair

Jana Dittmann

## Organizing Committee

Jana Dittmann

Christian Kraetzer

Silke Reifgerste

## Program Committee

Anas Abou El Kalam

UCA-ENSA of Marrakesh, Morocco

Eric Alata

LAAS-CNRS, France

Patrick Bas

CNRS-Lagis, Lille, France

David W. Chadwick

University of Kent, UK

Howard Chivers

University of York, UK

Isabelle Chrismnt

LORIA-University of Nancy, France

Gabriela F. Ciocarlie

Computer Science Lab, SRI International, USA

Frédéric Cuppens

Télécom Bretagne, France

Italo Dacosta

KU Leuven, Belgium

Hervé Debar

Télécom SudParis, France

## VIII Organization

Sabrina De Capitani di Vimercati	Università degli Studi di Milano, Italy
Bart De Decker	KU Leuven, Belgium
Yvo Desmedt	University of Texas at Dallas, USA and University College London, UK
Lieven De Strycker	KU Leuven, Technology Campus Ghent, Belgium
Jana Dittmann	University of Magdeburg, Germany
Stelios Dritsas	Athens University of Economics and Business, Greece
Gerhard Eschelbeck	Sophos, USA
Simone Fischer-Hübner	Karlstad University, Sweden
Teddy Furon	Inria Rennes - Bretagne Atlantique, France
Jürgen Fuß	University of Applied Sciences Upper Austria, Hagenberg, Austria
Sébastien Gambs	Université de Rennes 1 - Inria/Irisa, France
Christian Geuer-Pollmann	Microsoft Research, Germany
Dieter Gollmann	Hamburg University of Technology, Germany
Jean Hennebert	University of Applied Sciences, HES-SO, Switzerland
Eckehard Hermann	University of Applied Sciences Upper Austria, Hagenberg, Austria
Jens Hermans	KU Leuven, Belgium
Andreas Humm	University of Fribourg, Switzerland
Edward Humphreys	XiSEC, UK
Christophe Huygens	KU Leuven, Belgium
Witold Jacak	University of Applied Sciences Upper Austria, Hagenberg, Austria
Sushil Jajodia	George Mason University, USA
Günter Karjoth	IBM Research - Zurich, Switzerland
Stefan Katzenbeisser	TU Darmstadt, Germany
Markulf Kohlweiss	Microsoft Research Cambridge, UK
Romain Laborde	Institut de Recherche en Informatique de Toulouse (IRIT), France
Jorn Lapon	KU Leuven, Technology Campus Ghent, Belgium
Herbert Leitold	Secure Information Technology Center (A-SIT), Austria
Javier Lopez	University of Malaga, Spain
Louis Marinou	European Network and Information Security Agency (ENISA), Greece

Keith Martin	Royal Holloway, University of London, UK
Chris Mitchell	Royal Holloway, University of London, UK
Refik Molva	Eurécom, France
Yuko Murayama	Iwate Prefectural University, Japan
Vincent Naessens	KU Leuven, Technology Campus Ghent, Belgium
Nick Nikiforakis	KU Leuven, Belgium
Chandrasekaran Pandurangan	Indian Institute of Technology, Madras, India
Günther Pernul	University of Regensburg, Germany
Alessandro Piva	University of Florence, Italy
Franz-Stefan Preiss	IBM Research - Zurich, Switzerland
Jean-Jacques Quisquater	Université catholique de Louvain, Belgium
Kai Rannenber	Goethe University Frankfurt, Germany
Pierangela Samarati	Università degli Studi di Milano, Italy
Riccardo Scandariato	KU Leuven, Belgium
Ingrid Schaumüller-Bichl	University of Applied Sciences Upper Austria, Hagenberg, Austria
Jörg Schwenk	Ruhr-Universität Bochum, Germany
Stefaan Seys	KU Leuven, Belgium
Einar Snekkenes	Gjovik University College, Norway
Andreas Uhl	University of Salzburg, Austria
Umut Uludag	Scientific and Technological Research Council (TUBITAK), Turkey
Vijay Varadharajan	Macquarie University, Australia
Pedro Veiga	University of Lisbon, Portugal
Claus Vielhauer	Brandenburg University of Applied Sciences, Germany
Tatjana Welzer	University of Maribor, Slovenia
Andreas Westfeld	Dresden University of Applied Sciences, Germany
Ted Wobber	Microsoft Research Silicon Valley, USA
Shouhuai Xu	University of Texas at San Antonio, USA
Moti Yung	Google & Columbia University, USA
Gansen Zhao	South China Normal University, China
Ge Zhang	Karlstad University, Sweden

## Reviewers

Filipe Beato	Microsoft Research, Cambridge, UK
Michael Diener	University of Regensburg, Germany
Jean-Luc Dugelay	Eurécom, France
Miltiadis Kandias	Athens University of Economics and Business, Greece

Andrea Melle	Eurécom, France
Aleksios Mylonas	Athens University of Economics and Business, Greece
Moritz Riesner	University of Regensburg, Germany
Ahmad Sabouri	Goethe University Frankfurt, Germany
Moustafa Saleh	University of Texas, San Antonio, USA
Dieter Sommer	IBM Research - Zurich, Switzerland
Fatbardh Veseli	Goethe University Frankfurt, Germany
Qingji Zheng	University of Texas, San Antonio, USA

## **Sponsoring Institutions**

The Advanced Multimedia and Security Lab (AMSL) of the Otto-von-Guericke University of Magdeburg, Germany.



# Table of Contents

---

## Part I: Research Papers

---

### Biometrics

Towards a Standardised Testsuite to Assess Fingerprint Matching Robustness: The StirMark Toolkit – Cross-Feature Type Comparisons . . . . .	3
<i>Jutta Hämmerle-Uhl, Michael Pober, and Andreas Uhl</i>	
Achieving Anonymity against Major Face Recognition Algorithms . . . . .	18
<i>Benedikt Driessen and Markus Dürmuth</i>	
Client-Side Biometric Verification Based on Trusted Computing . . . . .	34
<i>Jan Vossaert, Jorn Lapon, Bart De Decker, and Vincent Naessens</i>	

### Applied Cryptography

Dedicated Hardware for Attribute-Based Credential Verification . . . . .	50
<i>Geoffrey Ottoy, Jorn Lapon, Vincent Naessens, Bart Preneel, and Lieven De Strycker</i>	
Decentralized Ciphertext-Policy Attribute-Based Encryption Scheme with Fast Decryption . . . . .	66
<i>Y. Sreenivasa Rao and Ratna Dutta</i>	

---

## Part II: Work in Progress

---

### Biometrics

Security of Features Describing the Visual Appearance of Handwriting Samples Using the Bio-hash Algorithm of Vielhauer against an Evolutionary Algorithm Attack . . . . .	85
<i>Andreas Hasselberg, Rene Zimmermann, Christian Kraetzer, Tobias Scheidat, Claus Vielhauer, and Karl Kümmel</i>	

## Digital Watermarking, Steganography and Forensics

Video Watermarking Scheme with High Payload and Robustness against Geometric Distortion . . . . .	95
<i>Huajian Liu, Yiyao Li, and Martin Steinebach</i>	
Use of Linear Error-Correcting Subcodes in Flow Watermarking for Channels with Substitution and Deletion Errors . . . . .	105
<i>Boris Assanovich, William Puech, and Iuliia Tkachenko</i>	
Detecting Resized Double JPEG Compressed Images – Using Support Vector Machine . . . . .	113
<i>Hieu Cuong Nguyen and Stefan Katzenbeisser</i>	
Pit Stop for an Audio Steganography Algorithm . . . . .	123
<i>Andreas Westfeld, Jürgen Wurzer, Christian Fabian, and Ernst Piller</i>	
Robust Hash Algorithms for Text . . . . .	135
<i>Martin Steinebach, Peter Klöckner, Nils Reimers, Dominik Wienand, and Patrick Wolf</i>	
Hardware Based Security Enhanced Direct Memory Access . . . . .	145
<i>Marcel Eckert, Igor Podebrad, and Bernd Klauer</i>	

## Social Network Privacy, Security and Authentication

Privacy Visor: Method for Preventing Face Image Detection by Using Differences in Human and Device Sensitivity . . . . .	152
<i>Takayuki Yamada, Seiichi Gohshi, and Isao Echizen</i>	
E-Learning of IT Security Threats: A Game Prototype for Children . . . .	162
<i>Jana Fruth, Carsten Schulze, Marleen Rohde, and Jana Dittmann</i>	
Hiding Information in Social Networks from De-anonymization Attacks by Using Identity Separation . . . . .	173
<i>Gábor György Gulyás and Sándor Imre</i>	
An Equivalent Access Based Approach for Building Collaboration Model between Distinct Access Control Models . . . . .	185
<i>Xiaofeng Xia</i>	

---

## Part III: Extended Abstracts

---

Authentication with Time Features for Keystroke Dynamics on Touchscreens . . . . .	197
<i>Matthias Trojahn, Florian Arndt, and Frank Ortmeier</i>	

Visibility Assessment of Latent Fingerprints on Challenging Substrates in Spectroscopic Scans . . . . .	200
<i>Mario Hildebrandt, Andrey Makrushin, Kun Qian, and Jana Dittmann</i>	
Creation of a Public Corpus of Contact-Less Acquired Latent Fingerprints without Privacy Implications . . . . .	204
<i>Mario Hildebrandt, Jennifer Sturm, Jana Dittmann, and Claus Vielhauer</i>	
SocACL: An ASP-Based Access Control Language for Online Social Networks . . . . .	207
<i>Edward Caprin and Yan Zhang</i>	
Watermark Resynchronization: An Efficient Approach Based on Eulerian Tours around a Robust Skeleton . . . . .	211
<i>Konstantinos Raftopoulos, Klimis Ntalianis, Paraskevi Tzouveli, Nicolas Tsapatsoulis, Aleatha Parker-Wood, and Marin Ferecatu</i>	

---

## Part IV: Keynotes

---

Face Recognition from Degraded Images – Super Resolution Approach by Non-adaptive Image-Independent Compressive Sensing Dictionaries . . . . .	217
<i>Sabah A. Jassim</i>	
Trustworthy Software Development . . . . .	233
<i>Sachar Paulus, Nazila Gol Mohammadi, and Thorsten Weyer</i>	
<b>Author Index</b> . . . . .	249