

## Contents – Part II

### Delegation and IP

Delegating RAM Computations with Adaptive Soundness and Privacy . . . . .	3
<i>Prabhanjan Ananth, Yu-Chi Chen, Kai-Min Chung, Huijia Lin, and Wei-Kai Lin</i>	
Interactive Oracle Proofs . . . . .	31
<i>Eli Ben-Sasson, Alessandro Chiesa, and Nicholas Spooner</i>	
Adaptive Succinct Garbled RAM or: How to Delegate Your Database. . . . .	61
<i>Ran Canetti, Yilei Chen, Justin Holmgren, and Mariana Raykova</i>	
Delegating RAM Computations . . . . .	91
<i>Yael Kalai and Omer Paneth</i>	

### Public-Key Encryption

Standard Security Does Not Imply Indistinguishability Under Selective Opening. . . . .	121
<i>Dennis Hofheinz, Vanishree Rao, and Daniel Wichs</i>	
Public-Key Encryption with Simulation-Based Selective-Opening Security and Compact Ciphertexts . . . . .	146
<i>Dennis Hofheinz, Tibor Jager, and Andy Rupp</i>	
Towards Non-Black-Box Separations of Public Key Encryption and One Way Function. . . . .	169
<i>Dana Dachman-Soled</i>	
Post-Quantum Security of the Fujisaki-Okamoto and OAEP Transforms . . . .	192
<i>Ehsan Ebrahimi Targhi and Dominique Unruh</i>	
Multi-key FHE from LWE, Revisited . . . . .	217
<i>Chris Peikert and Sina Shiehian</i>	

### Obfuscation and Multilinear Maps

Secure Obfuscation in a Weak Multilinear Map Model . . . . .	241
<i>Sanjam Garg, Eric Miles, Pratyay Mukherjee, Amit Sahai, Akshayaram Srinivasan, and Mark Zhandry</i>	

Virtual Grey-Boxes Beyond Obfuscation: A Statistical Security Notion  
for Cryptographic Agents . . . . . 269  
*Shashank Agrawal, Manoj Prabhakaran, and Ching-Hua Yu*

**Attribute-Based Encryption**

Deniable Attribute Based Encryption for Branching Programs from LWE . . . 299  
*Daniel Apon, Xiong Fan, and Feng-Hao Liu*

Targeted Homomorphic Attribute-Based Encryption . . . . . 330  
*Zvika Brakerski, David Cash, Rotem Tsabary, and Hoeteck Wee*

Semi-adaptive Security and Bundling Functionalities Made Generic  
and Easy . . . . . 361  
*Rishab Goyal, Venkata Koppula, and Brent Waters*

**Functional Encryption**

From Cryptomania to Obfustopia Through Secret-Key Functional  
Encryption . . . . . 391  
*Nir Bitansky, Ryo Nishimaki, Alain Passelègue, and Daniel Wichs*

Single-Key to Multi-Key Functional Encryption with Polynomial Loss . . . . . 419  
*Sanjam Garg and Akshayaram Srinivasan*

Compactness vs Collusion Resistance in Functional Encryption . . . . . 443  
*Baiyu Li and Daniele Micciancio*

**Secret Sharing**

Threshold Secret Sharing Requires a Linear Size Alphabet . . . . . 471  
*Andrej Bogdanov, Siyao Guo, and Ilan Komargodski*

How to Share a Secret, Infinitely . . . . . 485  
*Ilan Komargodski, Moni Naor, and Eylon Yogev*

**New Models**

Designing Proof of Human-Work Puzzles for Cryptocurrency and Beyond . . . 517  
*Jeremiah Blocki and Hong-Sheng Zhou*

Access Control Encryption: Enforcing Information Flow  
with Cryptography . . . . . 547  
*Ivan Damgård, Helene Haagh, and Claudio Orlandi*

**Author Index** . . . . . 577

# Contents – Part I

## TCC Test-of-Time Award

From Indifferentiability to Constructive Cryptography (and Back) . . . . .	3
<i>Ueli Maurer and Renato Renner</i>	

## Foundations

Fast Pseudorandom Functions Based on Expander Graphs . . . . .	27
<i>Benny Applebaum and Pavel Raykov</i>	
3-Message Zero Knowledge Against Human Ignorance . . . . .	57
<i>Nir Bitansky, Zvika Brakerski, Yael Kalai, Omer Paneth, and Vinod Vaikuntanathan</i>	
The GGM Function Family Is a Weakly One-Way Family of Functions . . . .	84
<i>Aloni Cohen and Saleet Klein</i>	
On the (In)Security of SNARKs in the Presence of Oracles . . . . .	108
<i>Dario Fiore and Anca Nitulescu</i>	
Leakage Resilient One-Way Functions: The Auxiliary-Input Setting . . . . .	139
<i>Ilan Komargodski</i>	
Simulating Auxiliary Inputs, Revisited . . . . .	159
<i>Maciej Skórski</i>	

## Unconditional Security

Pseudoentropy: Lower-Bounds for Chain Rules and Transformations. . . . .	183
<i>Krzysztof Pietrzak and Maciej Skórski</i>	
Oblivious Transfer from Any Non-trivial Elastic Noisy Channel via Secret Key Agreement. . . . .	204
<i>Ignacio Cascudo, Ivan Damgård, Felipe Lacerda, and Samuel Ranellucci</i>	
Simultaneous Secrecy and Reliability Amplification for a General Channel Model . . . . .	235
<i>Russell Impagliazzo, Ragesh Jaiswal, Valentine Kabanets, Bruce M. Kapron, Valerie King, and Stefano Tessaro</i>	

Proof of Space from Stacked Expanders. . . . . 262  
*Ling Ren and Srinivas Devadas*

Perfectly Secure Message Transmission in Two Rounds. . . . . 286  
*Gabriele Spini and Gilles Zémor*

**Foundations of Multi-Party Protocols**

Almost-Optimally Fair Multiparty Coin-Tossing with Nearly  
 Three-Quarters Malicious. . . . . 307  
*Bar Alon and Eran Omri*

Binary AMD Circuits from Secure Multiparty Computation . . . . . 336  
*Daniel Genkin, Yuval Ishai, and Mor Weiss*

Composable Security in the Tamper-Proof Hardware Model Under Minimal  
 Complexity . . . . . 367  
*Carmit Hazay, Antigoni Polychroniadou,  
 and Muthuramakrishnan Venkatasubramaniam*

Composable Adaptive Secure Protocols Without Setup Under Polytime  
 Assumptions. . . . . 400  
*Carmit Hazay and Muthuramakrishnan Venkatasubramaniam*

Adaptive Security of Yao’s Garbled Circuits . . . . . 433  
*Zahra Jafargholi and Daniel Wichs*

**Round Complexity and Efficiency of Multi-party Computation**

Efficient Secure Multiparty Computation with Identifiable Abort. . . . . 461  
*Carsten Baum, Emmanuela Orsini, and Peter Scholl*

Secure Multiparty RAM Computation in Constant Rounds . . . . . 491  
*Sanjam Garg, Divya Gupta, Peihan Miao, and Omkant Pandey*

Constant-Round Maliciously Secure Two-Party Computation in the RAM  
 Model . . . . . 521  
*Carmit Hazay and Avishay Yanai*

More Efficient Constant-Round Multi-party Computation from BMR  
 and SHE . . . . . 554  
*Yehuda Lindell, Nigel P. Smart, and Eduardo Soria-Vazquez*

Cross and Clean: Amortized Garbled Circuits with Constant Overhead . . . . . 582  
*Jesper Buus Nielsen and Claudio Orlandi*

**Differential Privacy**

Separating Computational and Statistical Differential Privacy  
in the Client-Server Model . . . . . 607  
*Mark Bun, Yi-Hsiu Chen, and Salil Vadhan*

Concentrated Differential Privacy: Simplifications, Extensions,  
and Lower Bounds . . . . . 635  
*Mark Bun and Thomas Steinke*

Strong Hardness of Privacy from Weak Traitor Tracing . . . . . 659  
*Lucas Kowalczyk, Tal Malkin, Jonathan Ullman, and Mark Zhandry*

**Author Index** . . . . . 691



<http://www.springer.com/978-3-662-53643-8>

Theory of Cryptography

14th International Conference, TCC 2016-B, Beijing,  
China, October 31-November 3, 2016, Proceedings,  
Part II

Hirt, M.; Smith, A. (Eds.)

2016, XV, 578 p. 32 illus., Softcover

ISBN: 978-3-662-53643-8