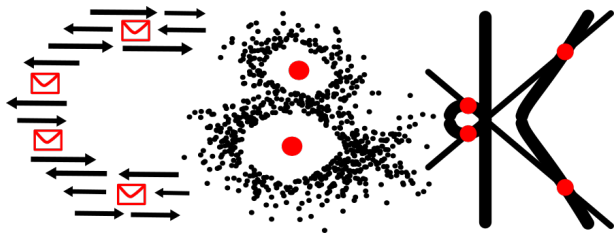


Current Topics in Cryptography

CTiC Seminar

Prof. Dr. Blömer

AG Codes und Kryptographie



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You should have basic knowledge in at least two of the following areas

- IT security
- cryptography
- network theory
- algorithms and data structures
- complexity theory
- probability theory and stochastics

- **All meetings are mandatory**
- **General kick-off meeting (today)**
- **Topic choice**
 - Send us your top 3 topics and your preferred time slot for your talk:
feidens@mail.upb.de
 - We distribute the topics
 - You can also swap your topic once with another willing person
- **Introductory Talk**
 - We will give a talk on the style of a scientific paper and how to work with literature.

- **Topic kick-off Meeting**

- Meeting with your supervisor.
- You should have read your assigned topic paper and understood main ideas
- We discuss your tasks and questions you have

- **Q&A day**

- We answer all of your questions in a personal meeting

- **Essay Draft**

- You hand in a "feature complete" draft of your essay
- "feature complete", i.e. everything you plan to have in the final essay should be included in this version.
- This is your chance to get comprehensive feedback on your work.

- **Talk Slides**

- We ask you to turn in the slides of your talk (presentation). We will give feedback for this.
- Any slot: All students have to hand in their slides one week before their talk.

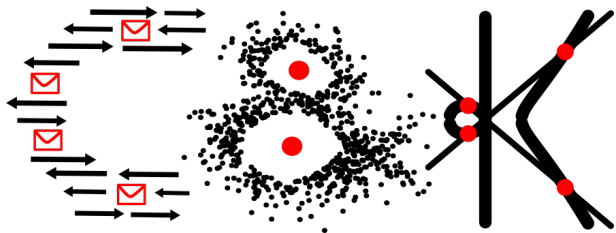
- **Talk**

- You will present your topic for all seminar participants and the supervisors in one of the available time slots (you have to be present for both time slots).
- Your talk should last 1h including discussion (plan to talk 45-50 minutes).

- **Essay Final Version**

- The final version of the essay should incorporate the feedback given for the draft version and your talk.

Topics



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- **BBA+: Improving the Security and Applicability of Privacy-Preserving Point Collection**
 - Refines security properties of a privacy-preserving point-collection system
 - Generic instantiation of the system
- **Breaking and Fixing Anonymous Credentials for the Cloud**
 - Moves the computational taxing tasks from IoT devices to a proxy (in the cloud).
 - Shows flaws in previous works
 - Shows how to fix them in a new model
- **Handoff All Your Privacy – A Review of Apple’s Bluetooth Low Energy Continuity Protocol**
 - Analyses what user data is leaked
 - Shows attacks on user's privacy
 - Reverse-engineered the continuity protocol

- **Keeping the Smart Home Private with Smart(er) IoT Traffic Shaping**
 - Detection and analysis of IoT specific network traffic
 - Adversaries track user movement, device usage, and more
 - Shows an algorithm to mix the regular IoT traffic better with non-IoT traffic
- **Fiat Shamir with Aborts**
 - A technique to turn identification protocols into signatures.
 - It is used to create efficient lattice-based signatures, which are post-quantum secure.
- **LWE Encryption**
 - An encryption scheme based on the LWE assumption, which is assumed to be post-quantum secure.

- **Foundations of Differential Privacy**
 - Privacy-preserving data analysis.
 - Need a meaningful and rigorous definition of privacy.
 - Goal: Introduce fundamental techniques of differential privacy.
- **Optimal Differentially Private Mechanisms for Randomised Response**
 - Randomised Response eliminates bias in surveying.
 - Participants flip a coin to determine how to answer (truthfully or random).
 - Goal: Examine Randomised Response in the context of differential privacy.

- **Matchmaking Encryption**
 - Special encryption: Users have policies and attributes. User A and User B can communicate if A's policy fits B's attributes and vice versa.
- **Efficient Verifiable Delay Functions**
 - A VDF is a function f such that $f(x)$ takes lots of time to compute, but given x and y , it is easy to check if $f(x) = y$. Useful for Proofs of Work.
- **A systematic literature review of blockchain-based applications: Current status, classification and open issues**
 - Blockchains are append-only ledgers for which huge ecosystems have recently been developed. This includes cryptocurrencies, but also other applications.
- **Algorand: Scaling Byzantine Agreements for Cryptocurrencies**
 - Algorand is a cryptocurrency that uses proofs of stake as a consensus mechanism (instead of costly proofs of work).

- **On Privacy Notions in Anonymous Communication**

- Communication over the internet is not anonymous (e.g., IP addresses leak location). Anonymous communication aims at preserving sender privacy. The paper is about privacy definitions.

- **Darknet Security: A Categorization of Attacks to the Tor Network**

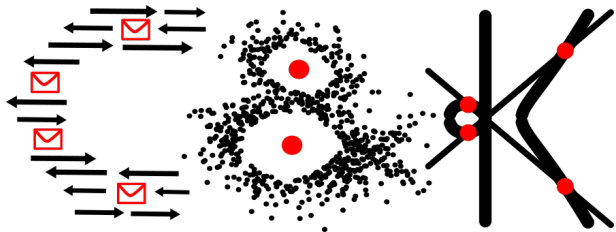
- Tor is a tool for anonymous communication. Their design emphasizes performance, leading to many (interesting) attack surfaces.

- **Robust Synchronous P2P Primitives Using SGX Enclaves**

- Intel SGX is a secure enclave within modern processors. Using its guarantees, one can cheaply implement secure efficient peer-to-peer networks.

- **Software protection and simulation on oblivious RAM**
 - Oblivious RAM enables access to remote storage without the remote storage server learning the accessed data, the data's address or even the type of access performed.
 - It has applications in cloud computing and multi-party computation.
 - This paper addresses the foundations of oblivious RAM and a simple, yet inefficient, ORAM scheme.
- **Path ORAM: An extremely simple oblivious RAM protocol**
 - The paper presents a more recent and much more efficient ORAM scheme whose performance is close to the optimal performance.

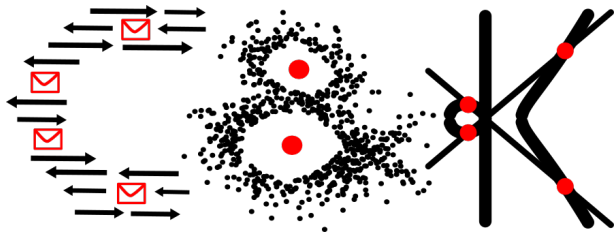
Dates



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	What	
Until Monday 14th	send us top 3 topics and your preferred time slot	deadline is at 23:59
Wednesday 16th	assignment of topics	
Until Friday 18th	exchange topic with willing students and inform us	deadline is at 23:59
Individual meetings with supervisor	topic kick-off meeting	
23.10.19, 16:15	introductory talk	
08.11.19	Q&A day	
10.12.19, 16:15	first slot for talk	send us your slides one week before your talk
29.01.20 & 30.01.20	second slot for talk	send us your slides one week before your talk
21.02.20	essay draft	
16.03.20	deadline: essay final version	

Questions...



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