

# Dipl.-Inf. Raffael Bild



## Contact Data

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## Research at a Glance

### Project:

Differentially Private Processing of Biomedical Data

### Supervisors:

Prof. Dr. Klaus A. Kuhn  
Prof. Dr. Alexander Horsch  
Dr. Fabian Prasser

### Start of doctoral project at GSB:

April 2015

### **Project Description:**

The focus of this dissertation will be research on technical measures for secure and privacy-preserving data processing in the biomedical domain. It will review existing concepts for privacy protection, evaluate them, and develop them further with respect to their application on sensitive biomedical data. Such data is often high-dimensional and has transactional characteristics (i.e. data originating from the repeated collection of similar attributes) and it is thus particularly difficult to process. One of the main goals of this dissertation is to develop and implement methods which satisfy a strong privacy model called differential privacy and to evaluate their application to biomedical data. To this end, combinations of methods for — statistical disclosure control and established, non-perturbative anonymization techniques recommended for the biomedical domain have been adapted and implemented in such a way that they satisfy the differential privacy model. This has resulted in a practicable algorithm which, analogously to traditional anonymization algorithms, can be parameterized with different models for measuring data quality to optimize its output towards different applications. In the further course of this doctoral project, these results will be extended to handle high-dimensional and transactional data. Moreover, more flexible anonymization methods, e.g. methods based on microaggregation and local recoding, will be addressed, and further strong privacy models which are related to differential privacy, e.g. zero-knowledge privacy and crowd-blending privacy, will be investigated.

## **Selected Publications**

Brandizi M, Melnichuk O, Bild R, Kohlmayer F, Rodriguez-Castro B, Spengler H, Kuhn KA, Kuchinke W, Ohmann C, Mustonen T, Linden M.

Orchestrating Differential Data Access for Transactional Research: A Pilot Implementation. *BMC medical informatics and decision making*. 2017;17(1):30.

Prasser F, Bild R, Eicher J, Spengler H, Kohlmayer F, Kuhn KA. Lightning Utility-Driven Anonymization of High-Dimensional Data. *Transactions on Data Privacy*. 2016;9(2):161—185.

Kuhn KA, Bild R, Anton G, Schuffenhauer S, Wichmann H-E. Vernetzung von Biobanken großer europäischer Kohorten (EU-Projekt BBMRI-LPC). *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz*. 2016;59(3):385-389.

Merino-Martinez R, Norlin L, van Enckevort D, Anton O, Schuffenhauer S, Silander K, Mook L, Holub P, Bild R, Swertz M, Litton JE.

Toward Global Biobank Integration by Implementation of the Minimum Information About Biobank Data Sharing

(MIABIS 2.0 Core). *Biopreservation and biobanking*. 2016;14(4):298-306

### **Conference Proceedings**

Prasser F, Eicher J, Bild R, Spengler H, Kuhn KA. A Tool for Optimizing De-Identified Health Data for Use in Statistical Classification. *Proceedings of the 30th IEEE International Symposium on Computer-Based Medical Systems*. 2017:169-174.

Prasser F, Bild R, Kuhn KA. A Generic Method for Assessing the Quality of De-Identified Health Data. *Proceedings of the MIE 2016 at HEC 2016*. August 2016;228:312-316.

**Poster**

Melnichuk O, Brandizi M, Spengler H, Kohlmayer F, Lauros J, Mustonen T, **Bild R**, Sarkans U.

Combining Existing Solutions to Enable Access to Restricted Biomedical Resources.  
Third BioMedBridges Annual General Meeting 2015.