

Zheguang Zhao

Research Fellow in Secure Systems
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Education

Ph.D. in Computer Science, Brown University, Rhode Island, 2021
Advisors: Stan Zdonik, Seny Kamara
Readers: George Kollios, Moti Yung
Thesis: *Building a Structurally-Encrypted Relational Database*
Software: **KafeDB**

M.Sc. in Computer Science, Brown University, Rhode Island, 2016
Advisor: Stan Zdonik
Readers: Tim Kraska, Ugur Cetintemel
Thesis: *Approximate Data Structures for Visualization*

B.Sc. in Computer Science, University of Wisconsin at Madison, Wisconsin, 2012
Advisor: Jignesh Patel, Ben Liblit

Certification & Technologies

ML/Stats: Tensorflow, Julia, Matlab, Deep Learning Specialization [[link](#)]
Systems: Spark, MapReduce, Linux Kernel, Network Security, Databases, GPGPU
PL: C/++, Go, Haskell, Java, Python, Prolog, Ruby, MIPS, Scala, SQL
Infra: AWS, Jenkins, Git, Jira, Docker, Kubernetes

Experiences

The University of Melbourne, *Research Fellow in Secure Systems* (2023-now)

Security in adversarial ML and human-AI collaboraiton. Hosted by Prof. Olya Ohrimenko and Prof. Ben Rubinstein

Technical University of Darmstadt, *Postdoc Researcher* (2021-2022)

Secure federated learning and databases. Hosted by Prof. Carsten Binnig in Data Management Group

Aroki Systems (now part of MongoDB), *Database Scientist* (2017-2021)

KafeDB, an end-to-end encrypted relational database based on SparkSQL

Los Alamos National Laboratory, *Research Intern* (2019)

ML model reconstruction of mixed dynamics in cyber-physical systems, with application to network verification and security

Microsoft AI & Research, *Research Intern* (2017)

Constraint learning. Hosted by DMX Group

Intel Labs, *Research Intern* (2015)

Efficiency of machine learning algorithms in Apache Spark

In-memory transactional processing using non-volatile memory

Hadapt (now part of Teradata), *Software Engineer* (2013-2014)

Enterprise SQL-on-Hadoop system including query execution, storage engine, high availability and analytics

Kosmix (now part of @WalmartLabs), *Software Engineer* (2012-2013)

In-memory distributed queue system for in-house stream processing

Great Lakes Bioenergy Research Center, *Software Engineer* (2009-2012)

Scientific database for biological enzyme research

Open Source

KafeDB: End-to-End Structurally-Encrypted Relational Database [\[link\]](#)

ML framework for Cypber-physical Systems [\[link\]](#)

Encrypted Searchable Signal [\[link\]](#)

Macau: statistical hypothesis testing based on resampling [\[link\]](#)

Machine learning algorithms in Spark [\[link\]](#)

Consistency control for machine learning algorithms [\[link\]](#)

R-tree in Rust [\[link\]](#)

Spark performance analysis tool [\[link\]](#)

VoltDB on non-volatile memory [\[link\]](#)

Preprints

An Optimal Relational Database Encryption Scheme [\[link\]](#)

Cryptology ePrint Archive: Report 2020/274

Learning of Cyber-Physical Systems

Advanced Network Science Initiative, Los Alamos National Laboratory, 2019

Behavior of Large Random Graph. [\[link\]](#)

Randomized Algorithms for Counting, Integration and Optimization, Brown University, 2017

Signal Search.[\[link\]](#)

Brown University, 2017

Publications

Towards Decentralized Parameter Servers for Secure Federated Learning DATA 2022

ACID-V: towards a New Class of DBMSs for Data Sharing

Polystores Workshop at VLDB, 2021

Encrypted Databases: from Theories to Systems

CIDR, January 2021

Dynamic Query Refinement for Interactive Data Exploration

EDBT/ICDT Joint Conference, March 2020

Investigating the Effect of the Multiple Comparisons Problem in Visual Analysis

CHI Conference, April 2018

Controlling False Discoveries During Interactive Data Exploration

SIGMOD Conference, May 2017

Safe Visual Data Exploration

SIGMOD Conference, Demo, May 2017

Bridging the Gap between HPC and Big Data frameworks

VLDB Journal, 2017

Towards Sustainable Insights

CIDR Conference, January 2017

Towards a Benchmark for Interactive Data Exploration

IEEE Data Engineering Bulletin, 2016.

Larger-than-memory Data Management on Modern Storage Hardware for In-memory OLTP Database Systems

SIGMOD DaMoN Workshop, June 2016

VisTrees: Fast Indexes for Interactive Data Exploration

SIGMOD HILDA Workshop, June 2016

Data Tiering in Heterogeneous Memory Systems

EuroSys Conference, April 2016

Teaching

Security Analytics, The University of Melbourne, 2023.

Data Management Labs, TU Darmstadt, 2021.

Introduction to Database Systems, Brown University 2015, 2018

Advanced Topics in Database Systems, Brown University 2015

Supervision

Benedikt Völker, *Client-side Validation for Detecting the Model Poisoning Attack in Federated Learning*
M.Sc.'21, TU Darmstadt

Philipp Imporatori, *Building an Oblivious Relational Database*
M.Sc.'22, TU Darmstadt

Shan Li, *Gradient-based Attacks on Federated Learning*
M.Sc.'22, TU Darmstadt

Services

Reviewer: OSDI'16, TVCG'21, TODS'21, IEEE S&P (Journal)'24, IEEE S&P (Oakland)'24

Program committee: VLDB'22 (Demo Track)

Member: IACR, ACM

Honors

Graduate Fellowship, Brown University, 2014-2019

Dean's Honor List, University of Wisconsin at Madison, 2007, 2008, 2009

Eta Kappa Nu, 2009

Upsilon Pi Epsilon, 2010

Golden Key International Honour Society, 2010

Dissertation Fellowship, Brown University, 2018-2019

References

Available upon request.