

# Zheguang Zhao

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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*

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

## Certification

Deep Learning Specialization, Coursera / [deeplearning.ai](https://deeplearning.ai) [[link](#)]

## Services

Reviewer: OSDI'16, TVCG'21, TODS'21

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

## Experiences

Technical University of Darmstadt, 2021

Postdoctoral research on secure federated learning and databases. Hosted by Prof. Carsten Binnig in Data Management Group

Los Alamos National Laboratory, 2019

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

Microsoft AI & Research, 2017

Constraint learning. Hosted by DMX Group

Intel Labs, 2015.

Efficiency of machine learning algorithms in Apache Spark

In-memory transactional processing using non-volatile memory

Hadapt (Acquired by Teradata), 2013

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

Kosmix (Acquired by @WalmartLabs), 2012

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

Great Lakes Bioenergy Research Center, 2010

Scientific database for biological enzyme research

## Thesis Supervision

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

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

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

Zhanglei Sun, *Practical Privacy-Preserving Federated Learning*  
M.Sc.'22, TU Darmstadt

## Teaching

Data Management Labs, TU Darmstadt, 2021.

Introduction to Database Systems, Brown University 2015, 2018

Advanced Topics in Database Systems, Brown University 2015

## 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

*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

## Software

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 [\[link\]](#)

## Funding

NSF Award #1514491, *III: Medium: 20/20: A System for Human-in-the-Loop Data Exploration*, 2015 (Graduate RA)

NSF Award #1916335, *SBIR Phase I: Encrypted Databases: From Theory to Systems*, 2019 (Graduate RA)

## References

Available upon request.