

# Konstantinos Konstantinidis

Ph.D., Iowa State University, Ames, IA

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## SKILLS

**Proficient:** Python • SQL • AWS • MATLAB • PyTorch • NumPy • MPI • MapReduce

**Good:** C++ • Java • Hadoop • HDFS • Excel • scikit-learn • Bash • Git • Jenkins • Splunk • PHP

## EDUCATION

### Iowa State University

Ph.D., Electrical and Computer Engineering, GPA: 3.94/4, Advisor: Prof. Aditya Ramamoorthy.

Ames, IA

Dec. 2022 (expected)

### Technical University of Crete

Diploma (5-year program), Electrical and Computer Engineering, GPA: 3.4/4, Advisor: Prof. George Karystinos.

Chania, Greece

Dec. 2016

## INDUSTRY EXPERIENCE

### Software Engineer Intern at Meta (Facebook) | Python, PHP, SQL, C++.

Menlo Park, CA | 05/2022 – 08/2022

Developed multiple debugging tools for machine learning feature authoring used in the data pipelines of Facebook Marketplace. The main component was a framework that categorizes errors during feature compilation, generates alerts, and assigns tasks to the appropriate team; this framework was integrated with the CI/CD. Another end product of my work was an internal UI tool to fetch and display feature values from low-latency storage after a series of transformations.

### Software Engineer Intern at C3.ai | Java, Python, AWS, Jenkins, Splunk.

Redwood City, CA | 06/2021 – 08/2021

Implemented an end-to-end framework for cluster failure prediction; the framework has two components. The first is the data pipeline which loads cluster health metrics, handles missing data, and creates a training data set. The second component is the ML pipeline which trains a model and makes predictions regarding the cluster's state as soon as new test data becomes available. Followed the process of continuous integration / continuous deployment (CI/CD).

## RESEARCH PROJECTS

### ByzShield: Robust distributed learning | Python, PyTorch, AWS, MPI, Bash.

01/2020 – 04/2021

Developed a defense for distributed deep learning setups in which computing devices may return erroneous or malicious gradients. The method is robust to the most sophisticated attacks and achieves, on average, a **20%** increase in top-1 accuracy on the **CIFAR-10** dataset over prior defenses. It also enjoys a **36%** reduction in the fraction of corrupted gradients.

### CAMR: Aggregated MapReduce over multiple jobs | Python, AWS, MPI, Bash.

12/2018 – 04/2020

Proposed a method named *CAMR*, which reduces the MapReduce communication overhead when the desired functions can be aggregated (amenable to deep learning applications). It achieves state-of-the-art communication load but with an exponentially smaller requirement on the minimum number of jobs. Its speedup is **4.3×** over the baseline approach.

### Staggler mitigation in matrix multiplication

07/2018 – 01/2019

Proposed and implemented a technique to tolerate the presence of *stragglers*, i.e., servers that periodically suffer from slow computation. Our algorithm can alleviate a higher number of slow servers than related work and requires approximately **80%** of the time needed by prior methods on actual AWS EC2 simulations.

### MapReduce communication load reduction | C++, AWS, MPI, Hadoop, HDFS, Bash.

05/2017 – 12/2018

Proposed an algorithm to reduce **MapReduce** communication load; it uses *Single Parity Check* codes and design theory to assign tasks to servers and splits files less finely than prior work. Tweaked the **TeraSort** algorithm (to sort data sets in **HDFS**). The method uses **MPI** for communication. It supersedes the state-of-the-art by **2.6×** and the baseline approach by **4.7×** on AWS EC2 clusters.

## SELECTED AWARDS

- **Best Student Poster Award**, Midwest Machine Learning Symposium (MMLS), June 2019 ([link](#)).
- **Teaching Excellence Award**, Iowa State University, May 2019.

## SELECTED PUBLICATIONS ([GOOGLE SCHOLAR](#))

- **K. Konstantinidis** and A. Ramamoorthy, "Aspis: Robust Detection for Distributed Learning," *IEEE International Symposium on Information Theory (ISIT)*, July 2022.
- **K. Konstantinidis** and A. Ramamoorthy, "ByzShield: An Efficient and Robust System for Distributed Training," *Machine Learning and Systems (MLSys)*, April 2021.
- **K. Konstantinidis** and A. Ramamoorthy, "Resolvable Designs for Speeding up Distributed Computing," *IEEE Transactions on Networking (ToN)*, May 2020.
- L. Tang, **K. Konstantinidis** and A. Ramamoorthy, "Erasure coding for distributed matrix multiplication for matrices with bounded entries," *IEEE Communication Letters (CL)*, January 2019.
- **K. Konstantinidis** and A. Ramamoorthy, "Leveraging Coding Techniques for Speeding up Distributed Computing," *IEEE Global Communications Conference (GLOBECOM)*, December 2018.