Dimitra Giantsidi

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Research Interests

I like to build robust and efficient distributed systems!
My research lies in the field of dependability in distributed systems with focus on the fault tolerance and security. Exploring the applications of modern hardware, such as Trusted Execution Environments and Direct I/O for networking and storage, my work aims to increase the security and performance of widely adopted distributed systems. As such, I have build a few intersting systems: a secure distributed transactional store on top of Intel SGX, RDMA and LSM KVs, a shielded direct I/O network library for robust replication and a shared log system for serverless computing infrastucture on top of byte-addressable storage.
My current work focuses on the design of a trusted NIC architecture for large-scale distributed systems in untrusted cloud environments.

Education

Ph.D. in Computer Science (Sept 2019 - present)
University of Edinburgh, UK
Thesis: Hardware-Assisted Distributed Dependable Systems, **Microsoft Research PhD Fellow**
Advisor: Prof. Dr. Pramod Bhatotia

MSc in Computer Science (Sept 2018 - Aug 2019)
University of Edinburgh, UK
Best Performing Female MSc Thesis Award

MEng in Computer and Electrical Engineering (Sept 2012 - Mar 2018)
National Technical University of Athens (NTUA), Greece

Employment

Microsoft Research, Cambridge, UK Sept 2021 - Dec 2021
Research Intern
· Design of KVs for timing attacks for Intel SGX (openenclave framework) and RDMA.

University of Edinburgh, UK June 2023 - present
Research Assistant
· Hardware/software co-design of a trusted NIC architecture for robust replication.

Intracom Telecom, Athens, Greece Jul 2017 - Jul 2018
Software Systems Engineer
· Performance and energy optimization of NFV services.

Honors and Awards

Best paper nominee at DSN'22

Microsoft Research scholarship, 2019

Best Performing Female MSc Thesis Award for MSc thesis, 2019

Ph.D. Dissertation

Topic: Hardware-Assisted Dependable Distributed Systems
Supervisor: Prof. Dr. Pramod Bhatotia
In the context of my Ph.D. dissertation, I designed and built distributed systems for the untrusted cloud infrastructure to increase their security properties and performance leveraging the recent hardware advancements in trusted computing (Trusted Execution Environments, e.g., Intel SGX, AMD-SEV), storage (byte-addressable storage) and networking (RDMA, direct I/O, SmartNICs).

Research projects:

A Trusted NIC Architecture: Hardware architecture, networking stack, and its applications in building robust distributed systems protocols **Under submission**

Using Modern Cloud Hardware to build Robust and Efficient Replication Protocols for Distributed Data Stores **Under submission**

FlexLog: A Shared Log for Stateful Serverless Computing **[HPDC'23)] [code]**

Treaty: Secure Distributed Transactions **[DSN'22 (Best paper nominee)] [code]**

Publications

Conference publications:

A Trusted NIC Architecture: Hardware architecture, networking stack, and its applications in building robust distributed systems protocols
Under submission

Using Modern Cloud Hardware to build Robust and Efficient Replication Protocols for Distributed Data Stores
Under submission

Anchor: Secure Persistent Memory Architecture
Dimitris Stravakakis, Dimitra Giantsidi, Maurice Bailleu, Philip Saendig, Shady Issa, Pramod Bhatotia
SIGMOD'24

FlexLog: A Shared Log for Stateful Serverless Computing
Dimitra Giantsidi, Emmanouil Giortamis, Nathaniel Tornow, Florin Dinu, Pramod Bhatotia
ACM HPDC'23

Treaty: Secure Distributed Transactions
Dimitra Giantsidi, Maurice Bailleu, Natacha Crooks, Pramod Bhatotia
IEEE/IFIP DSN'22 (Best paper nominee)

Avocado: A Secure In-Memory Distributed Storage System.
Maurice Bailleu, Dimitra Giantsidi, Vasilis Gavrielatos, Le Quoc Do, Vijay Nagarajan, Pramod Bhatotia
USENIX ATC'21

DICER: Diligent Cache Partitioning for Efficient Workload Consolidation
Konstantinos Nikas, Nikela Papadopoulou, Dimitra Giantsidi, Vasileios Karakostas, Georgios Goumas, Nectarios Koziris
ICPP'19

Open Source Projects

A Trusted NIC Architecture

— *https://github.com/dgiantsidi/replication-protos*

— *https://github.com/dgiantsidi/Coyote-playground*

FlexLog

— *https://github.com/TUM-DSE/FlexLog*

Treaty

— *https://github.com/TUM-DSE/Treaty*

Personal (research) projects

— *https://github.com/dgiantsidi/ctxswitch-bench*

— *https://github.com/dgiantsidi/protocols-aCounters*

— *https://github.com/dgiantsidi/client-server-model*

Talks

ACM HPDC'23, Orlando, US
FlexLog: A Shared Log for Stateful Serverless Computing

IEEE/IFIP DSN'22, Baltimore, US
Treaty: Secure Distributed Transactions

Third Annual SGX Community Day 2022 (virtual)

USENIX ATC'21 (virtual)
Avocado: A Secure In-Memory Distributed Storage System

Teaching experience and Supervision

Teaching assistant: Operating systems and Distributed Systems Engineering courses, University of Edinburgh and TU Munich, Dec 2019 - present.

— Operating Systems, University of Edinburgh, Semester 2 (Spring), 2019 - 2022

— Computer systems lab, Cloud-lab, Advanced systems programming, TU Munich, Winter and Summer Semesters, 2020 - 2023

BSc/MSc thesis advisor: Supervised 3 BSc and 2 MSc thesis in TU Munich, Dec 2020 - present.

Professional activities

Web chair: **EuroSys'21**

Shadow PC member: **EuroSys'23**, **SoCC'23**, **WWW'22**

Skills

Languages: C/C++, Python, Bash, Golang, Java, Vitis HLS

Systems and Tools: RocksDB and folly library, TEEs (Intel SGX, OpenEnclave SDK, AMD-sev), direct network I/O (DPDK, RDMA,Alveo SmartNICs), SPDK, Intel RDT, LLVM, collectd, POSIX/Unix, OpenMP and MPI, gRPC

Virtualization: KVM, Qemu/Libvirt, Docker, Kubernetes

Distributed Programming: Hadoop MapReduce, Socket and RPC programming

References

Prof. Dr. Pramod Bhatotia
TU Munich, Germany
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Prof. Dr. Natacha Crooks
UC Berkeley, USA
Email: `ncrooks@berkeley.edu`

Prof. Dr. Manos Kapritsos
University of Michigan, USA
Email: `manosk@umich.edu`

Dr. Florin Dinu
Huawei Research Center Munich, Germany
Email: `florin.dinu@huawei.com`