Fadhil I. Kurnia

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RESEARCH INTERESTS

Distributed Systems, Networked Systems,
Privacy-preserving Systems,
Systems for Machine Learning

EDUCATIONS

UNIVERSITY OF MASSACHUSETTS AMHERST — 2020 - MAY 2026 (expected)
MS/PhD in Computer Science - CGPA 3.95/4.0 — Amherst, MA, USA

BANDUNG INSTITUTE OF TECHNOLOGY (ITB) — 2015-2019
BSc in Computer Science - CGPA 3.83/4.0 Graduated with **Cum Laude Distinction** — Bandung, Indonesia

PUBLICATIONS

ReFlex: Replicating Blackbox Stateful Services with Flexible Consistency — *under submission, manuscript ready upon request*
Fadhil I. Kurnia, Arun Venkataramani

Oblivious Paxos: Privacy-Preserving Consensus Over Secret-Shares — ACM Symposium on Cloud Computing (SoCC) 2023
Fadhil I. Kurnia, Arun Venkataramani

Oblivious Paxos: Privacy-Preserving Consensus Over Secret-Shares (Extended Version) — UMass Tech Report 2023
Fadhil I. Kurnia, Arun Venkataramani

Extending and Programming the NVMe I/O Determinism Interface for Flash Arrays — ACM Transactions on Storage (ToS) 2023
Huaicheng Li, Martin L. Putra, Ronald Shi, **Fadhil I. Kurnia**, Xing Lin, Jaeyoung Do,
Achmad I. Kistijantoro, Gregory R. Ganger, Haryadi S. Gunawi

RESEARCH EXPERIENCES

Transparent, Efficient, and Privacy-Preserving Distributed Replication Protocols — UMass Amherst | Aug 2020-present
Advisor: Dr. Arun Venkataramani
- Implemented prototypes of Paxos based privacy-preserving consensus protocols: Oblivious Paxos and Fast Oblivious Paxos.
- Developed novel approaches for replicating blackbox web services on Cloud Edge with configurable consistency guarantee.
- Implemented and benchmarked protocols for different consistency levels: linearizability, sequential and causal consistency.

Eliminating Tail Latencies in Flash Arrays with Redundancy — University of Chicago | May 2018-Dec 2019
Advisors: Dr. Haryadi S. Gunawi, Dr. Huaicheng Li
- Implemented RAID-like redundancy in flash arrays to eliminate tail latency, the client sends requests to multiple SSD and proceeds with the fastest responses, using C-based SSDSim. Presented the result as my bachelor thesis [code][thesis].
- Added checkpoint messages inside the Linux kernel for measurement purposes. Profiled prototype performance using fio.
- The result is published at SOSP'21 with my name mentioned in the Acknowledgement [paper]. Published in ACM ToS.

Garbage Collection (GC) Scheduling in RAID SSD — Bandung Institute of Technology | Aug 2018-May 2019
Advisor: Dr Achmad I. Kistijantoro, Riza S. Pradana
- Implement GC scheduling mechanism in multi-SSD environments. Simulate the mechanism in SSDSim, modify it to support more than 1 SSD simulation. I presented the result as my bachelor thesis. [code][report].

H-Touch: Application for Visually Impaired People — SMA 3 Semarang | 2014
- Developed an Android application with input mimicking braille characters, tested together with blind community in Semarang, Indonesia. This project received a Gold Medal in Indonesian Science Project Olympiad 2014, and was nominated to participate in 2014 International Youth Invention Exhibition in Taiwan. [regional-news] [local-news].

Faster System: Fast and Secure Cashier System — SMA 3 Semarang | 2013
- Develop a software that utilizes RFID to automatically calculate price in grocery store checkout, this system can eliminate long queues in supermarkets. This project was awarded a Silver Medal in Indonesian Science Project Olympiad 2013 and Gold Medal in Infomatrix 2013, Bucharest, Romania. [national-news].

RESEARCH TALKS

2024 "Towards declarative replication" - San Francisco Systems Meetup, August 2024.
2023 "Privacy-Preserving Consensus Over Secret-Shares" - Symposium on Cloud Computing (SoCC), Santa Cruz, California.

INDUSTRY EXPERIENCES

Meta - Research Scientist Intern — Menlo Park, California, USA | May-Aug 2025
- Developed Raft join-consensus for MySQL replication to speed up system reconfiguration duration from hours to seconds.
- Integrated join-consensus into two variants of Raft protocol: Vanilla Raft and FlexiRaft.

Google - PhD Intern — Sunnyvale, California, USA | May-Aug 2024
- Developed a Bandwidth Enforcer (BwE) feature to prioritize internal traffic without global information (i.e., network unaware) by downgrading overflow traffic into multiple lower classes while maximizing consistent network class usage.
- Used Python and C++ with an event-driven and parallel Monte Carlo simulator to rigorously analyze the feature, ensuring minimal regression compared to previous enforcement that downgraded traffic to a single lower class, not multiple classes.
- The new multi-class downgrade feature potentially frees up ~25% of bandwidth currently used by overflow traffic, making bandwidth available for higher-priority tasks, like machine learning, that already have their bandwidth quota approved.

Ruangguru - Backend Engineer — Jakarta, Indonesia | Feb-Aug 2020

- Developed and maintained 3 backend services, written in Go, to handle quiz events and online learning platforms, the main feature of the apps, with over 10K req/s. Decreased avg latencies by ~30% with Redis caching layer on top of the services.
- Ensured the correctness of distributed transactions spanning multiple independent backend services. Implemented and registered the rollback mechanism in Cadence, a widely used micro-service orchestrator.
- Initialized LMS development that supports 100+ schools/ organizations and their 100,000+ students during the pandemic.

Bukalapak - Machine Learning Engineer Intern — Bandung, Indonesia | Jan-Mar 2019

- Developed a light middle-layer that intercepts requests and responses to/from machine learning services for the machine learning scientists so they can analyze the deployed machine learning model's accuracy.
- Successfully gathered the prediction results from 5 machine learning services with small latency overhead.
- Tech stack: Go, Python, Kafka, MongoDB, Docker.

Tokopedia - Software Engineer Intern — Jakarta, Indonesia | May-Aug 2017

- Implemented Tokopedia Feed which adds posts to user feed when their favorite shops are listing new products.
- Implemented online mark & last seen feature in Tokopedia Chat website for 1,000,000+ monthly active users.
- Tech stack: Go, PostgreSQL, Redis, NSQ, React JS, Neo4J Graph DB.

Suitmedia - Mobile Developer Intern — Bandung, Indonesia | Dec 2016 - May 2017

- Maintained Android application with hundreds of active users. Bug fixing and improving algorithm efficiency. Also, create a new Android app as one of the company's products.

TEACHING EXPERIENCES

2022 Fall - Guest Lecturer of CS653-Advanced Computer Networking, University of Massachusetts Amherst.
2021 Spring, Summer - Teaching Assistant of CS187-Programming w/ Data Structure, University of Massachusetts Amherst.
2019 Spring - Teaching Assistant of IF3111-Platform Based Development in Bandung Institute of Technology (ITB).

HONORS & AWARDS

2025 Research Grant from the 2025 Open Source Research Experience, University of California Santa Cruz.
2025 Student Grant for the 2025 Symposium on Networked Systems Design and Implementation (NSDI), Philadelphia, USA.
2023 Travel Scholarship for ACM Symposium on Cloud Computing (SoCC) 2023, Santa Cruz, California, USA.
2023 Fellowship for EPFL Summer Research Institute (SuRI) 2023 on Systems, Security, and Privacy. Lausanne, Switzerland.
2021 The Jim Gray Graduate Scholarship in Computer Science, CICS, UMass Amherst, USA.
2019 South East Asia Machine Learning School (SEAMLS) Travel Grant in Depok, Indonesia.
2019 Experience KAIST School of Computing (SoC) Travel Grant in Daejeon, South Korea.
2014 Gold Medal at Indonesia Science Project Olympiad (ISPO 2014), Computer category.
2014 Runner-up at Indonesia Student Research Olympiad - Central Java province, Salatiga, Indonesia.
2013 Gold Medal at Infomatrix 2013, International Project Competition in Bucharest, Romania.

SERVICES

2026 Artifact Evaluation Committee in Usenix Symposium on Networked Systems Design and Implementation (NSDI)
2025 Artifact Evaluation Committee in Usenix Annual Technical Conference (ATC)
2025 Artifact Evaluation Committee in Usenix Symposium on Operating Systems Design and Implementation (OSDI)
2024 Research Mentor in the UMass Early Research Scholars Program (ESRP) program (Fall 24 & Spring 25)
2024 Research Mentor in the UMass Summer Undergraduate Research Volunteers (URV) program
2023 Artifact Evaluation Committee in Usenix Annual Technical Conference (ATC)
2023 Artifact Evaluation Committee in Usenix Symposium on Operating Systems Design and Implementation (OSDI)
2022 Artifact Evaluation Committee in ACM SIGCOMM
2022 Artifact Evaluation Committee in Usenix Annual Technical Conference (ATC)
2022 Mentor in the UMass CICS PhD Application Support Program (PASP)
2022 Artifact Evaluation Committee in Usenix Symposium on Operating Systems Design and Implementation (OSDI)
2022 Artifact Evaluation Committee in EuroSys'22

TECHNICAL SKILLS

Lang: C/C++, Go, Java, Python, PHP, Shell Script DB: MySQL, SQLite, Postgres, Redis Others: Kafka, FUSE, Docker, eBPF

REFERENCES

Dr. Arun Venkataramani,	Professor of Computer Science, University of Massachusetts Amherst.
Dr. Marco Serafini,	Associate Professor of Computer Science, University of Massachusetts Amherst.
Dr. Haryadi S. Gunawi,	Associate Professor of Computer Science, University of Chicago.
Dr. Huaicheng Li,	Assistant Professor of Computer Science, Virginia Tech.
Dr. Muhammed Uluyol,	Senior Software Engineer, Google.
Michael Percy,	Technical Lead, Meta.