

Daniar H. Kurniawan

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SUMMARY	<ul style="list-style-type: none">• Strong background in AI/ML and Distributed Systems with 7+ years of experience in Cloud Systems research.• Co-authored publications in the top Systems Conferences such as ASPLOS, OSDI, SIGCOMM, and EUROSYS.• Published 4 first-author papers (out of 9) in peer-reviewed conferences.• Mentored 10+ (undergrad/master) students in a research mentorship program in the past 3 years.	
EDUCATION	University of Chicago Ph.D. in Computer Science (<i>Advisor: Haryadi S. Gunawi</i>) M.S. in Computer Science Bandung Institute of Technology (ITB) B.S. in Computer Science (<i>Graduated with Cum Laude distinction</i>)	Chicago, IL (<i>Expected</i>) August 2023 December 2020 Bandung, Indonesia July 2017
HONORS & AWARDS	Travel Grants: ICEEI'15, ICAICTA'16, ICEEI'17, SOCC'18, SYSTOR'22 University Unrestricted (UU) Fellowship, University of Chicago CERES outstanding 1 st year student (2 awarded in CS dept.), University of Chicago The 3 rd place award at Webfest 2017 at CERN, Switzerland First place award at IBM business plan competition, IBM Indonesia Awarded a full-scholarship for my undergraduate degree at ITB	2015–2022 2020 2018 2017 2015 2013–2017
TECHNICAL SKILLS	ML/AI: Tensorflow, Keras, PyTorch Testbed / Cloud Platform: Emulab Cluster, Chameleon Cloud, Amazon Web Service, Google Cloud Platform Systems: <i>Hacking</i> a giant/complex code base of Linux Kernel, JVM, Spark, Hadoop, Hive, Cassandra, Couchbase, Hillview, CORTX P/L: Python, C/C++, Java, JavaScript Database / Distributed Systems: Advanced user on ZooKeeper, BerkeleyDB, Voldemort, MongoDB, MySQL, PostgreSQL, Amazon DynamoDB, Amazon Redshift, Ceph, MinIO, Memcached, Redis Soft. Development: Android, Unity, Java Swing, and Web-based (with Laravel, React, Django)	
Software (Open Sourced)	EVStore (Embedding-aware Storage System): Designed and developed an optimized caching layer for Facebook's DLRM, implemented in ~9000 LOC (70% python, 25% C/C++, and 5% bash scripts). [ASPLOS'23] → https://github.com/ucare-uchicago/ev-store-dlrm DMCK (Distributed system Model Checking): Developed a module to detect distributed-concurrency bugs in Spark and improved the multi-threading scheme that speeds up the node-restart by 4x. [OSDI'14, EUROSYS'19] → https://github.com/ucare-uchicago/DMCK	
WORK EXPERIENCE	Research Experience at Universities: University of Chicago, UCARE Group Graduate Student Researcher working on Machine Learning and Distributed Systems research. Institut Teknologi Bandung, Garuda Ilmu Komputer (GIK) Lab. Undergraduate Student Researcher studying scalability-bug at cloud and distributed systems platforms. Working on Spark, Hadoop, Couchbase, and Voldemort. Deploying up to 256 nodes on academic cluster. Japan Advanced Institute of Science and Technology, Hasegawa Lab. Undergraduate Student Researcher leading the development of scalable low-latency e-Learning platform	
	Research Internships at Industrial Labs: Seagate Technology, Advanced Development Group (ADG) Developing the request tracing feature at CORTX object store and improving CORTX accessibility by publishing various benchmarking experiments (with Kubernetes, Ceph, and MinIO) on Chameleon cluster. Seagate Technology, Advanced Development Group (ADG) Improved the dependency integration and performance of CORTX components by pushing bug fixes and pull requests to CORTX repository supervised by the Director of Seagate Storage Architecture. VMware Research, Office of CTO Integrated Hillview with Cassandra and Hive to visualize a large (billion-row) dataset which led to 5x performance improvement compared to vanilla Cassandra, evaluated on 15 nodes cluster with ~200 million rows. Microsoft Research (New York) Performed big data analysis over ~1TB traces of Microsoft's cloud-scale production web framework. Implemented our novel scheduling method, E2E (SIGCOMM'19), on Cassandra and RabbitMQ cluster. CERN (Geneva, Switzerland) The first Indonesian students to be accepted at CERN's most competitive summer student program, OpenLab. Led the development and exploration of satellite maps navigation using VR in collaboration with United Nation.	
	Engineering Internships in Industry: Multibook (Tokyo, Japan) Improved the database architecture and the unit testing of Multibook's ERP System GDP Venture (Jakarta, Indonesia) Initiated databases migration to Amazon Redshift and optimized the query which results in 50× speedup	

RECENT PROJECTS	EVStore: Scaling Embedding Tables for Deep Recommendation Systems [ASPLOS'23] 2021–2022
	Modern Deep Recommendation Systems (DRS) depend on fast inferences to be useful. Unfortunately, inference requires multiple embedding-vector (EV) table lookups, if any memory access is slow, the whole inference is slow. We propose EVStore, a 3-layer EV table lookup system to provide optimized caching. At a minor cost of accuracy, EVStore can reduce the DRS memory usage by up to 94%, yielding enormous savings for these costly, pervasive systems.
CONFERENCE PUBLICATIONS	IONET: An Open Machine Learning Training Ground for I/O Performance Prediction 2020–2022
	In the literature, we see an increase of research that leverages ML for solving system problems including storage systems. However, performing ML-for-storage research is hard because the researcher must know both the storage side as well the ML side, as if studying two different fields at the same time. Therefore, we present FlashNet, an open ML training ground for I/O latency prediction. We implemented various ML techniques such as <i>Neural Network, Random Forrest, AutoML, Transformer, and Continual Learning</i> for improving IO latency prediction.
ASPLOS'23	<u>Daniar H. Kurniawan</u> , Ruipu Wang, Kahfi Zulkifli, Fandi Wiranata, John Bent, Ymir Vigfusson, Haryadi S. Gunawi. EVStore: Storage and Caching Capabilities for Scaling Embedding Tables in Deep Recommendation Systems . In <i>Proceedings of the 28th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)</i> , 2023. (To Appear)
CLOUD'22	Meng Wang, Cesar A. Stuardo, <u>Daniar H. Kurniawan</u> , Ray A. O. Sinurat, and Haryadi S. Gunawi. Let's Cut the Tail Together with LIBROS: Library, Runtime and OS Supports for Multi-Resource Storage . In <i>Proceedings of the IEEE International Conference on Cloud Computing (CLOUD)</i> , 2022.
TR'21	<u>Daniar H. Kurniawan</u> , Levent Toksoz, Mingzhe Hao, Henry Hoffmann, Tim Emami, Sandeep Madireddy, Anirudh Badam, Robert B. Ross, and Haryadi S. Gunawi. IONET: Towards an Open Machine Learning Training Ground for I/O Performance Prediction published at University of Chicago Technical Report, 2021.
TR'20	<u>Daniar H. Kurniawan</u> , Cesar A. Stuardo, Ray A. O. Sinurat, and Haryadi S. Gunawi. Notification and Prediction of Heap Management Pauses in Managed Languages for Latency Stable Systems published at University of Chicago Technical Report, 2020.
SIGCOMM'19	Xu Zhang, Siddhartha Sen, <u>Daniar H. Kurniawan</u> , Haryadi S. Gunawi, and Junchen Jiang. E2E: Embracing User Heterogeneity to Improve Quality of Experience on the Web . In <i>Proceedings of the ACM Special Interest Group on Data Communication (SIGCOMM)</i> , 2019.
EUROSYS'19	Jeffrey F. Lukman, Huan Ke, Cesar A. Stuardo, Riza O. Suminto, <u>Daniar H. Kurniawan</u> , Dikaimin Simon, Satria Priambada, Chen Tian, Feng Ye, Tanakorn Leesatapornwongsa, Aarti Gupta, Shan Lu, and Haryadi S. Gunawi. FlyMC: Highly Scalable Testing of Complex Interleavings in Distributed Systems . In <i>Proceedings of The European Conference on Computer Systems (EUROSYS)</i> , 2019.
SOCC'17	Riza O. Suminto, Cesar A. Stuardo, Alexandra Clark, Huan Ke, Tanakorn Leesatapornwongsa, Bo Fu, <u>Daniar H. Kurniawan</u> , Vincentius Martin, Uma Maheswara Rao G., and Haryadi S. Gunawi. PBSE: A Robust Path-Based Speculative Execution for Degraded-Network Tail Tolerance in Data-Parallel Frameworks . In <i>Proceedings of the ACM Symposium on Cloud Computing (SOCC)</i> , 2017.
ICEEI'17	<u>Daniar H. Kurniawan</u> and Yani Widayani. Sci-Learn: A Novel E-Learning Platform Based on Gamification and Social Media Approach . In <i>Proceedings of the International Conference on Electrical Engineering and Informatics (ICEEI)</i> , 2017.
OSDI'16	Riza O. Suminto, Cesar Stuardo, Alexandra Clark, Huan Ke, Bo Fu, Tanakorn Leesatapornwongsa, Vincentius Martin, <u>Daniar H. Kurniawan</u> , and Haryadi S. Gunawi. PBSE: Path-Based Speculative Execution for Robust Tail Tolerance in Data-Parallel Systems . The 12 th USENIX Symposium on Operating Systems Design and Implementation (OSDI), 2016. (Poster)
OSDI'16	Tanakorn Leesatapornwongsa, Cesar Stuardo, Huan Ke, Jeffrey F. Lukman, Riza O. Suminto, <u>Daniar H. Kurniawan</u> , and Haryadi S. Gunawi. SCK: Scale-Checking and Debugging Scalability Bugs on One Machine . The 12 th USENIX Symposium on Operating Systems Design and Implementation (OSDI), 2016. (Poster)
ICAICTA'16	<u>Daniar H. Kurniawan</u> and Rinaldi Munir. Double Chaining Algorithm: A Secure Symmetric-key Encryption Algorithm . In <i>Proceedings of the International Conference on Advanced Informatics: Concepts, Theory and Application (ICAICTA)</i> , 2016.
IEICE'16	Shinobu Hasegawa and <u>Daniar H. Kurniawan</u> . Development of Multi Agent for Test of Recommendation Functions on Social Learning Platform . In <i>Proceedings of the Institute of Electronics, Information and Communication Engineers (IEICE)</i> , 2016.
ICEEI'15	<u>Daniar H. Kurniawan</u> and Rinaldi Munir. A New String Matching Algorithm Based on Logical Indexing . In <i>Proceedings of the International Conference on Electrical Engineering and Informatics (ICEEI)</i> , 2015.
SERVICE	Secondary/Sub-reviewer
	SOSP: ACM Symposium on Operating Systems Principles 2020, 2021
	OSDI: <i>USENIX Symposium on Operating Systems Design and Implementation</i> 2021
	APSys: ACM Asia-Pacific Workshop on Systems 2020
	Artifact Evaluation Committee
	OSDI: <i>USENIX Symposium on Operating Systems Design and Implementation</i> 2021
	JSys: Journal of Systems Research 2021, 2022
	Departmental Service
	Graduate Student Ministry: Co-minister of International Affairs, CS Dept, University of Chicago 2021
REFERENCE	Available upon request.