2022 IEEE 11th Non-Volatile **Memory Systems and Applications Symposium** (NVMSA 2022)

Taipei, Taiwan 23 – 25 August 2022



IEEE Catalog Number: CFP2234Z-POD ISBN:

978-1-6654-5079-9

Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP2234Z-POD

 ISBN (Print-On-Demand):
 978-1-6654-5079-9

 ISBN (Online):
 978-1-6654-5078-2

ISSN: 2575-2561

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-040

Phone: (845) 758-0400 Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



2022 IEEE 11th Non-Volatile Memory Systems and Applications Symposium (NVMSA)

NVMSA 2022

Table of Contents

M	lessage from the General and Program Chairs	viii
Oı	rganizing Committee	ix
	ogram Committee	
	eering Committee	
	eviewers	
Oı	rganizer and Sponsors	xiii
S	ession 1: Best Paper Candidates	
Efi	ficient and Atomic-Durable Persistent Memory through In-PM Hybrid Logging	1
Bu	affered Hash Table: Leveraging DRAM to Enhance Hash Indexes in the Persistent Memory Chen Zhong (University of Texas, USA), Prajwal Challa (University of Texas, USA), Xingsheng Zhao (University of Texas, USA), and Song Jiang (University of Texas, USA)	8
HI	NFFS: Revisiting the NOR Flash File System Yanqi Pan (Harbin Institute of Technology, China), Zhisheng Hu (Harbin Institute of Technology, China), Nan Zhang (Harbin Institute of Technology, China), Hao Hu (Harbin Institute of Technology, China), Wen Xia (Harbin Institute of Technology, China), Zhongming Jiang (Harbin Institute of Technology, China), Liang Shi (East China Normal University, China), and Shiyi Li (Harbin Institute of Technology, China)	14

Session 2: Emerging and Hybrid Memory Minimizing Age-of-Information of NVRAM-based Intermittee

Minimizing Age-of-Information of NVRAM-based Intermittent Systems
RNA-seq Quantification on Processing in Memory Architecture: Observation and Characterization
Liang-Chi Chen (National Cheng Kung University, Taiwan), Shu-Qi Yu (National Taiwan University, Taiwan), Chien-Chung Ho (National Cheng Kung University, Taiwan), Yuan-Hao Chang (Academia Sinica, Taiwan), Da-Wei Chang (National Cheng Kung University, Taiwan), Wei-Chen Wang (National Taiwan University, Taiwan; Massachusetts Institute of Technology, USA), and Yu-Ming Chang (Wolley Inc. USA)
Latency Aware Page Migration for Read Performance Optimization on Hybrid SSDs
Session 3: Invited Session I: SW Issues for NVM
Polling Based Per-Core Workqueue Management in XFS Journaling
A Read Performance Analysis with Storage Hierarchy in Modern KVS: A RocksDB Case
Session 4: Solid-State Drives
An Integrated Subpage-Aware Write Method in Large-Page-Based SSDs Chin-Hsien Wu (Department of Electronic and Computer Engineering, National Taiwan University of Science and Technology, Taiwan) and Chian-Shiang Ou Yang (Department of Electronic and Computer Engineering, National Taiwan University of Science and Technology, Taiwan)
Nimble Mapping SSD: Leaning State Mapping Strategy to Increase Reliability of 3D TLC Charge-Trap NAND Flash Memory
Technology, Taiwan)

RUSM: Harnessing Unused Resources in 3D NAND SSD to Enhance Reading Performance	
Hasan Alhasan (National Taiwan University, Taiwan), Yun-Chih Chen	
(National Taiwan University, Taiwan), Chien-Chung Ho (National Cheng	
Kung University, Taiwan), and Tei-Wei Kuo (Academia Sinica & National	
Taiwan University, Taiwan)	
Author Index	