Sanidhya Kashyap

Assistant Professor

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I. Earned Degrees

Ph.D.	2020	Georgia Institute of Technology (GaTech)	*Computer Science*
M.S.	2014	International Institute of Information Technology - Hyderabad (IIIT-H)	*Computer Science*
B.Tech.	2012	International Institute of Information Technology - Hyderabad (IIIT-H)	*Computer Science*

II. Employment History

Assistant Professor	School of Computer and Communication Science EPFL, Lausanne, Switzerland	*Nov 2020–present*
Research Intern	VMware Research VMware, Mountain View, CA	*May 2018–Aug 2018*
Research Intern	Penumbra Oracle Labs, Burlington, MA	*Jun 2017–Aug 2017*
Research Intern	Penumbra Oracle Labs, Burlington, MA	*May 2016–Aug 2016*

III. Honors and Awards

[1] **Early Career Research Grant.**
VMware (2022)

[2] **Dissertation Award.**
College of Computing, Georgia Institute of Technology (2021)

[3] **Outstanding Graduate Research Assistant Award.**
College of Computing, Georgia Institute of Technology (2020)

[4] **Best student paper award.**
EuroSys (2017)

[5] **Best paper award.**
APSys (2015)

IV. Research

A. Refereed Publications and Submitted Articles

A.1. Thesis

[1] **Ph.D. Thesis**
Title: *Scaling Synchronization Primitives*
Date: June 2020
Advisors: Taesoo Kim and Changwoo Min
Georgia Institute of Technology (GaTech)

[2] **M.S. Thesis**
Title: *An Enhanced Approach to Live Migration of Virtual Machines*
Date: May 2014
Advisor: Suresh Purini
International Institute of Information Technology - Hyderabad (IIIT-H)

A.2. Conference Articles (Refereed)

[1] **Odinfs: Scaling PM Performance with Opportunistic Delegation**. Diyu Zhou, Yuchen Qian, Vishal Gupta, Zhifei Yang, Changwoo Min, and Sanidhya Kashyap. *In Proceedings of the 2022 USENIX Symposium on Operating Systems Design and Implementation (OSDI 2022).*

[2] **Application-Informed Kernel Synchronization Primitives**. Sujin Park, Diyu Zhou, Yuchen Qian, Irina Calciu, Taesoo Kim, and Sanidhya Kashyap. *In Proceedings of the 2022 USENIX Symposium on Operating Systems Design and Implementation (OSDI 2022).*

[3] **Birds of a Feather Flock Together: Scaling RDMA RPCs with FLOCK**. Sumit Kumar Monga, Sanidhya Kashyap, and Changwoo Min. *In Proceedings of the 28th ACM Symposium on Operating Systems Principles (SOSP 2021).*

[4] **PACTree: A High Performance Persistent Range Index Using PAC Guidelines**. Wook-Hee Kim, R. Madhava Krishnan, Xinwei Fu, Sanidhya Kashyap, and Changwoo Min. *In Proceedings of the 28th ACM Symposium on Operating Systems Principles (SOSP 2021).*

[5] **Preventing Use-After-Free Attacks with Fast Forward Allocation**. Brian Wickman, Hong Hu, Insu Yun, Daehee Jang, JungWon Lim, Sanidhya Kashyap, and Taesoo Kim. *In Proceedings of the 30th USENIX Security Symposium (Security 2021).*

[6] **NrOs: Effective Replication and Sharing in an Operating System**. Ankit Bhardwaj, Chinmay Kulkarni, Reto Achermann, Irina Calciu, Sanidhya Kashyap, Ryan Stutsman, Amy Tai, and Gerd Zellweger. *In Proceedings of the 2021 USENIX Symposium on Operating Systems Design and Implementation (OSDI 2021).*

[7] **Contextual Concurrency Control**. Sujin Park, Irina Calciu, Taesoo Kim, and Sanidhya Kashyap. *In Proceedings of the 18th Workshop on Hot Topics in Operating Systems (HotOS XVIII).*

[8] **Rethinking Software Runtimes for Disaggregated Memory**. Irina Calciu, M. Talha Imran, Ivan Puddu, Sanidhya Kashyap, Hasan Al Maruf, Onur Mutlu, Aasheesh Kolli. *In Proceedings of the 26th ACM Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2021).*

[9] **KRACE: Data Race Fuzzing for Kernel File Systems**. Meng Xu, Sanidhya Kashyap, Hanqing Zhao, and Taesoo Kim. *In Proceedings of the 41st IEEE Symposium on Security and Privacy (S&P 2020).*

[10] **Scalable and Practical Locking With Shuffling**. Sanidhya Kashyap, Irina Calciu, Xiaohe Cheng, Changwoo Min, and Taesoo Kim. *In Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP 2019).*
GT News

[11] **Finding Semantic Bugs in File Systems with an Extensible Fuzzing Framework**. Seulbae Kim, Meng Xu, Sanidhya Kashyap, Jungyeon Yoon, Wen Xu, and Taesoo Kim. *In Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP 2019).*
GT News, GT News

[12] **RECIPE: Converting Concurrent DRAM Indexes to Persistent-Memory Indexes**. Se Kwon Lee, Jayashree Mohan, Sanidhya Kashyap, Taesoo Kim, and Vijay Chidambaram. *In Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP 2019).*
GT News

[13] **SplitFS: Reducing Software Overhead in File Systems for Persistent Memory**. Rohan Kadekodi, Se Kwon Lee, Sanidhya Kashyap, Taesoo Kim, Aasheesh Kolli, and Vijay Chidambaram. *In Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP 2019).*
PIRL, GT News

[14] **Fuzzing File Systems via Two-Dimensional Input Space Exploration**. Wen Xu, Hyungon Moon, Sanidhya Kashyap, Po-Ning Tseng, and Taesoo Kim. *In Proceedings of the 40th IEEE Symposium on Security and Privacy (S&P 2019).*
GT News

[15] **MV-RLU: Scaling Read-Log-Update with Multi-Versioning**. Jaeho Kim, Ajit Mathew, Sanidhya Kashyap, Madhava Krishnan Ramanathan, and Changwoo Min. *In Proceedings of the 23rd ACM Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2019).*
Concurrency Freaks

[16] **Scaling Guest OS Critical Sections With *e*CS**. Sanidhya Kashyap, Changwoo Min, and Taesoo Kim. *In Proceedings of the 2018 USENIX Annual Technical Conference (ATC 2018).*

[17] **A Scalable Ordering Primitive for Multicore Machines**. Sanidhya Kashyap, Changwoo Min, Kangnyeon Kim, and Taesoo Kim. *In Proceedings of the 13th ACM European Conference on Computer Systems (EuroSys 2018).*

[18] **SOLROS: A Data-Centric Operating System Architecture for Heterogeneous Computing**. Changwoo Min, Woonhak Kang, Mohan Kumar, Sanidhya Kashyap, Steffen Maass, and Taesoo Kim. *In Proceedings of the 13th ACM European Conference on Computer Systems (EuroSys 2018).*

[19] **LATR: Lazy Translation Coherence**. Mohan Kumar, Steffen Maass, Sanidhya Kashyap, Jan Vesely, Zi Yan, Taesoo Kim, Abhishek Bhattacharjee, and Tushar Krishna. *In Proceedings of the 23rd ACM Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2018).*

[20] **Designing New Operating Primitives to Improve Fuzzing Performance**. Wen Xu, Sanidhya Kashyap, Changwoo Min, and Taesoo Kim. *In Proceedings of the 24th ACM Conference on Computer and Communications Security (CCS 2017).*
Mozilla research

[21] **Scalable NUMA-aware Blocking Synchronization Primitives**. Sanidhya Kashyap, Changwoo Min, and Taesoo Kim. *In Proceedings of the 2017 USENIX Annual Technical Conference (ATC 2017).*

[22] **Mosaic: Processing a Trillion-Edge Graph on a Single Machine**. Steffen Maass, Changwoo Min, Sanidhya Kashyap, Woonhak Kang, Mohan Kumar, and Taesoo Kim. *In Proceedings of the 12th ACM European Conference on Computer Systems (EuroSys 2017).*
Best Student paper
Hacker News, The Next Platform, GT News, the morning paper

[23] **Instant OS Updates via Userspace Checkpoint-and-Restart**. Sanidhya Kashyap, Changwoo Min, Byoungyoung Lee, Taesoo Kim, and Pavel Emelyanov. *In Proceedings of the 2016 USENIX Annual Technical Conference (ATC 2016).*
Linux Plumbers Conference 2015, CRIU

[24] **Understanding Manycore Scalability of File Systems**. Changwoo Min, Sanidhya Kashyap, Steffen Maass, Woonhak Kang, and Taesoo Kim. *In Proceedings of the 2016 USENIX Annual Technical Conference (ATC 2016).*

[25] **Cross-checking Semantic Correctness: The Case of Finding File System Bugs**. Changwoo Min, Sanidhya Kashyap, Byoungyoung Lee, Chengyu Song, and Taesoo Kim. *In Proceedings of the 25th ACM Symposium on Operating Systems Principles (SOSP 2015).*
Bug Report

[26] **Scalability in the Clouds! A Myth or Reality?**. Sanidhya Kashyap, Changwoo Min, and Taesoo Kim. *In Proceedings of the 6th Asia-Pacific Workshop on Systems (APSys 2015).*
Best paper, nominated to Operating Systems Review (OSR)
LWN: qspinlock in Linux

[27] **RLC: A Reliable Approach to Fast and Efficient Live Migration of Virtual Machines in the Clouds**. Sanidhya Kashyap, Jaspal Singh Dhillon, and Suresh Purini. *In Proceedings of the 8th IEEE Conference on Cloud Computing (CLOUD 2014).*

[28] **Virtual Machine Coscheduling: A Game Theoretic Approach**. Jaspal Singh Dhillon, Suresh Purini, and Sanidhya Kashyap. *In Proceedings of the 6th ACM/IEEE Conference on Utility Computing (UCC 2013).*

A.3. Journal Articles

[1] **Finding Bugs in File Systems with an Extensible Fuzzing Framework**. Seulbae Kim, Meng Xu, Sanidhya Kashyap, Jungyeon Yoon, Wen Xu, and Taesoo Kim. *ACM Transactions on Storage (TOS 2020).*
GT News, GT News

[2] **Opportunistic Spinlocks: Achieving Virtual Machine Scalability in the Clouds**. Sanidhya Kashyap, Changwoo Min, and Taesoo Kim. *ACM SIGOPS Operating Systems Review (OSR), Volumn 50-1.*
LWN: qspinlock in Linux

A.4. Non-Refereed Articles

[1] **Correct, Fast Remote Persistence**. Sanidhya Kashyap, Dai Qin, Steve Byan, Virendra J. Marathe, and Sanketh Nalli. *Arxiv*, September, 2019.
Arxiv preprint: 1909.02092

[2] **Persistent Memory Transactions**. Virendra Marathe, Achin Mishra, Amee Trivedi, Yihe Huang, Faisal Zaghloul, Sanidhya Kashyap, Margo Seltzer, Tim Harris, Steve Byan, Bill Bridge, and Dave Dice. *Arxiv*, March, 2018.
Arxiv preprint: 1804.00701

B. Presentations

[1] **Next-Generation Storage Stack**
HCIO 2022 Next-Generation Cloud Infrastructures (06/2022), Huawei Innovation Summit 2022 (07/2022)

[2] **Contextual Concurrency Control**
IISC Bangalore (03/2022)

[3] **Application-defined Concurrency**
Huawei systems software innovations summit (03/2021)

[4] **Scaling Synchronization Mechanisms for Many-core OS**
Purdue University (01/2020), Boston University (02/2020), Yale University (02/2020), Microsoft Research (03/2020), VMware Research (03/2020), EPFL (04/2020), UBC (04/2020)

[5] **Scalable and Practical Locking with Shuffling**
ACM Symposium on Operating Systems Principles (10/2019)

[6] **Scaling Guest OS Critical Sections with eCS**
USENIX Annual Technical Conference (08/2018)

[7] **A Scalable Ordering Primitive for Multicore Machines**
European Conference on Computer Systems (04/2018)

[8] **Scalable NUMA-aware Blocking Synchronization Primitives**
Paypal (08/2017), USENIX Annual Technical Conference (08/2017)

[9] **Instant OS Updates via Userspace Checkpoint-and-Restart**
USENIX Annual Technical Conference (07/2016), Oracle Labs (06/2016)

[10] **Rebootless Kernel Update and its Verification**
Linux Plumbers Conference (07/2015)

[11] **Do Virtual Machines Really Scale?**
Linux Plumbers Conference (07/2015)

[12] **Scalability in the Clouds! A Myth or Reality?**
Asia-Pacific Workshop on Systems (06/2015)

V. Individual Student Guidance

A. PhD students

[1] **Vishal Gupta**
Fall 2021–present
Topic: Scaling Systems with Advanced Synchronization Mechanisms

[2] **Vojtech Aschenbrenner**
Spring 2022–present
Topic: Scalable Storage Stack for Heterogeneous Hardware

[3] **Yugesh Kothari**
Spring 2022–present
Topic: Practical Formal Concurrency

[4] **Tao Lyu**
Fall 2021–present
Topic: Fuzzing Distributed Systems all the way

B. MS student

[1] **Yuchen Qian**
June 2021–present

[2] **Guochao Xie**
Sept 2021–present

C. Project students

[1] **Yunxin Sun**
June 2021–Sept 2021
Project: Scalable file system for PM

[2] **Fahad Nayar**
June 2021–Sep 2021
Project: Lock verification

[3] **Kartikeya Kumar**
Jan 2022–present
Project: Towards Synchronization and beyond

[4] **Vedant Paranjape**
Jun 2022–present
Project: Bare-metal virtualization

[5] **Gautam Aggarawal**
Jun 2022–present
Project: Evaluating userspace file systems performance

D. Mentorship of Postdoctoral Fellows

[1] **Diyu Zhou**
June 2021–present

Teaching Experience

Spring 2021	CS 601: Topics in Designing Scalable Systems Software
Fall 2021	CS 323: Introduction to Operating Systems
Spring 2022	CS 206: Concurrency & Parallelism
Fall 2022	CS 323: Introduction to Operating Systems

VI. Service

A. Professional Contributions

A.1. Conference Committee Activities

[1] Program Committee: *EuroSys*–2023

[2] External Review Committee: *ASPLOS*–2023

[3] Program Committee: *HotStorage*–2023

[4] Program Committee: *FAST*–2022, 2023

[5] Program Committee: *SYSTOR*–2021

[6] Program Committee: *ATC*–2021

A.2. Journal

[1] *ACM Transactions on Architecture and Code Optimization (TACO)*, 2020

A.3. Memberships and Activities in Professional Societies

[1] Member, Association for Computing Machinery (ACM)

[2] Member, The Advanced Computing Systems Association (USENIX)

B. Institute Contributions

[1] *EDIC Admission Committee*, 2021, 2022