

# Mihir Nanavati

Co-Founder and Software Engineer, IOP Systems

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## Industrial Experience

- 2023 – **Co-Founder and Software Engineer**, *IOP Systems*, New York City, NY.  
Developed a platform which collects performance telemetry and surfaces actionable insights to increase software efficiency and drive better hardware utilization. Built the telemetry pipeline which stores and queries both raw metrics data as well as materializes aggregated, non-time-series views, which are used for human and automated analysis.
- 2021 – 2023 **Staff Software Engineer**, *Twitter*, New York City, NY.  
*Infrastructure Efficiency*: Increased density for co-located workloads running on shared on-prem hardware resulting in savings of \$xxM in 2022 and projected savings of \$xxxM in 2023+ by providing better cache, socket, and network interface isolation between workloads.  
*Compute/Orchestration*: Scaled Twitter’s compute clusters to support millions of cores by developing a federation layer that transparently aggregated them into a single monocluster. Built a write-aggregating and connection-pooling proxy for cluster services to announce themselves to a ZooKeeper-based service discovery system.
- 2018 – 2020 **Postdoctoral Researcher**, *Microsoft Research New York*, New York City, NY.  
Applied machine learning to optimize the performance of data store indexes (in a research context), and the efficiency of Azure’s virtual machine provisioning (as part of the *Real World Reinforcement Learning* team), which resulted in a 15-25% reduction in downtime [SoCC’21].
- 2014 – 2016 **Senior Software Engineer**, *Coho Data*, Vancouver, BC.  
Lead development of Decibel [NSDI’17]: a “next-generation” network-attached block storage device which presented virtualized and isolated remote storage on top of shared devices. By bypassing the kernel for I/O, it achieved millions of IOPS at microsecond latencies (comparable to local devices) on a 1U server—over an order of magnitude improvement over the existing system.
- 2006 – 2009 **Security Software Engineer**, *Miel e-Security Systems*, Mumbai, India.  
Developed Helios to detect rootkits and other hidden malware on Windows using cross-view detection. Helios was later integrated into the Intel open-source RPIER forensic toolkit.

## Education

- 2019 **Ph.D. in Computer Science**, *University of British Columbia*, Vancouver.  
*Thesis*: Operator, Number Please: Mediating Access to Shared Resources for Efficiency and Isolation  
*Advisors*: Andy Warfield and Bill Aiello
- 2011 **M.Sc. in Computer Science**, *University of British Columbia*, Vancouver.  
*Thesis*: Breaking Up is Hard to Do: Security and Functionality in a Commodity Hypervisor  
*Advisors*: Andy Warfield and Bill Aiello
- 2007 **B.E. in Computer Engineering**, *Gujarat University (LD Engineering)*, Ahmedabad, India.

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## Academic Research Highlights

- [Nature'20] **Reproducible, Distributed Genomics**, *University of British Columbia*.  
Reduced the runtime of whole genome sequencing analysis pipelines from weeks and months to hours and days by distributing compute jobs across private clusters and public clouds using a custom-built serverless container framework. Enabled reproducibility by tracking data provenance and reduced wasted compute by caching intermediate results for frequently executed analyses.
- [Eurosys'13] **Fine-Grained Memory Remapping**, *University of British Columbia*.  
Transparently eliminated false sharing in running applications with a combination of binary instrumentation-based, sub-page memory remapping and low-overhead cache line contention detection. Moving falsely shared regions of memory onto independent, non-contending cache lines improved performance in certain multi-core benchmarks by 3–6x.
- [SOSP'11] **Hypervisor Disaggregation**, *University of British Columbia and Citrix Systems*.  
Reduced the overall trusted code (TCB) in the Xen hypervisor by 90% by decomposing a monolithic privileged domain into a set of independent domains, each with reduced privilege. Also reduced the temporal scope of exploits by periodically rebooting privileged domains to known-good states.
- [HotSec'11] **Authorship Attribution**, *University of British Columbia*.  
Demonstrated the fragility of double-blind peer-review in academic conferences by building a stylometric classifier that uses tells in labelled reviews to identify the authors of anonymous ones.

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## Selected Publications

- [SoCC'21] **Sayer: Using Implicit Feedback to Optimize System Policies**  
Mathias Lécuyer, Sang Hoon Kim, Mihir Nanavati, Junchen Jiang, Siddhartha Sen, Amit Sharma, and Aleksandrs Slivkins  
ACM Symposium on Cloud Computing (SoCC), 2021
- [Nature'20] **Massive Haplotypes Underlie Ecotypic Differentiation in Sunflowers**  
Marco Todesco et al. (Rieseberg Lab including Mihir Nanavati)  
Nature, Plant Genomics, 2020
- [HotCloud'20] **Disaggregation and the Application**  
Sebastian Angel, Mihir Nanavati, and Siddhartha Sen  
USENIX Workshop on Hot Topics in Cloud Computing (HotCloud), 2020
- [NSDI'17] **Decibel: Isolation and Sharing in Disaggregated Rack-Scale Storage**  
Mihir Nanavati, Jake Wires, and Andrew Warfield  
USENIX Symposium on Networked Systems Design and Implementation (NSDI), 2017
- [Eurosys'13] **Whose Cache Line is it Anyway? Operating System Support for Live Detection and Repair of False Sharing**  
Mihir Nanavati, Mark Spear, Nathan Taylor, Shriram Rajagopalan, Dutch T. Meyer, William Aiello, and Andrew Warfield  
ACM European Conference on Computer Systems (Eurosys), 2013
- [SOSP'11] **Breaking Up is Hard to Do: Security and Functionality in a Commodity Hypervisor**  
Patrick Colp, Mihir Nanavati, Jun Zhu, William Aiello, George Coker, Tim Deegan, Pete Loscocco, and Andrew Warfield  
ACM Symposium on Operating Systems Principles (SOSP), 2011
- [HotSec'11] **Herbert West – Deanonymizer**  
Mihir Nanavati, Nathan Taylor, William Aiello, and Andrew Warfield  
USENIX Workshop on Hot Topics in Security (HotSec), 2011