



Systems and Performance Research Lab at Santa Clara University

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Principal Investigator: Dr. Younghyun Cho

- Assistant Professor at Santa Clara University (Sep. 2023 – present)
- Former Postdoc at UC Berkeley (Aug. 2020 – Aug. 2023)
- Received Ph.D. from Seoul National University (Aug. 2020)
- Former visiting researcher at ETH Zurich (March – May 2018, June – Aug. 2016)

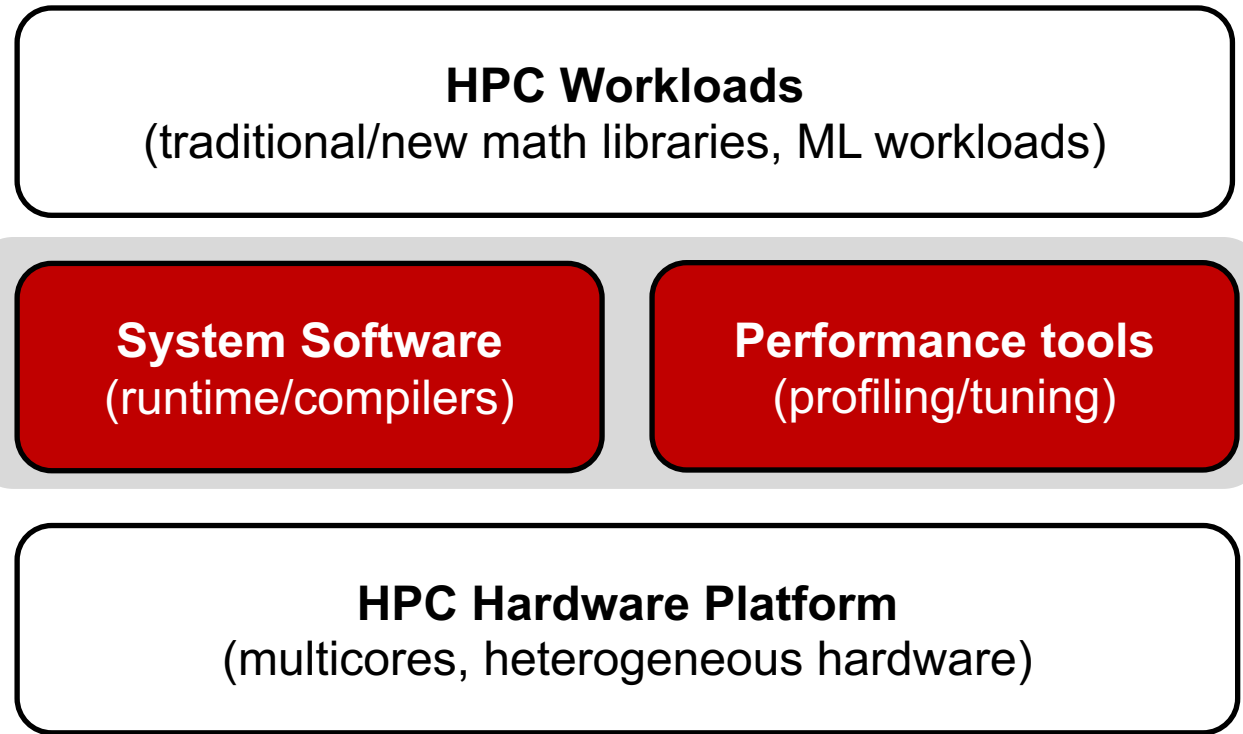


Dr. Younghyun Cho



Research Objectives

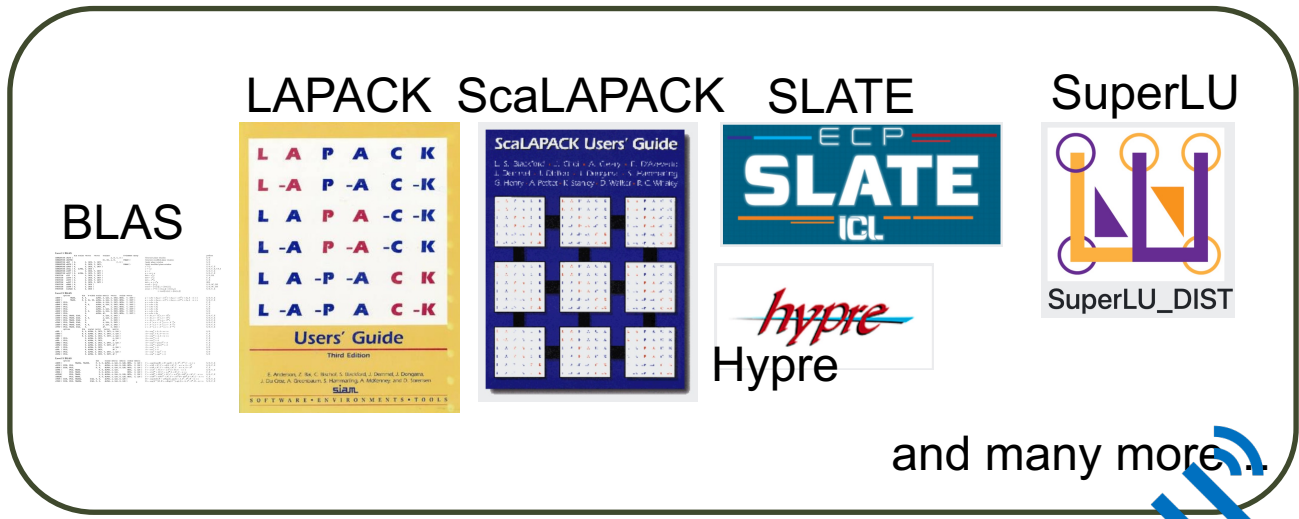
- System software and performance tools for High-Performance Computing (HPC)
 - Considering new applications and hardware trends



Topic: Automated Performance Tuning

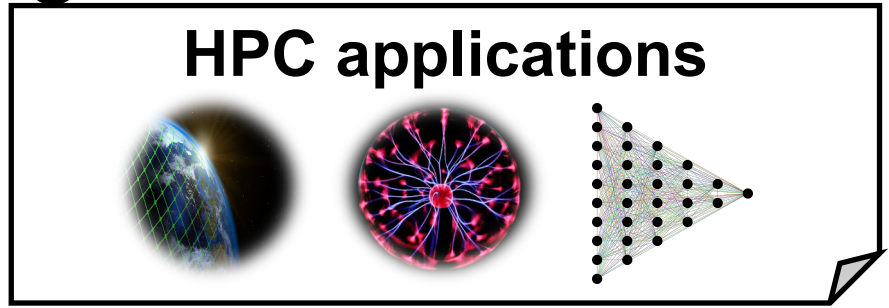
BLAS

LAPACK ScaLAPACK SLATE SuperLU



and many more

HPC applications



HPC Libraries

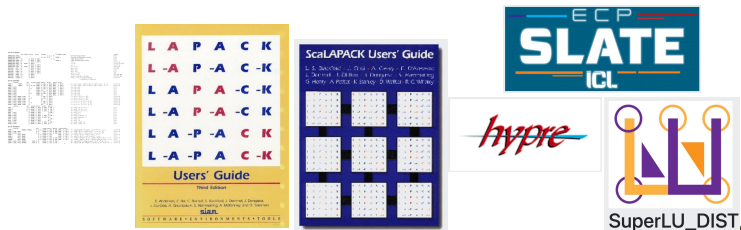
HPC Platform

Automating performance tuning and achieving performance portability

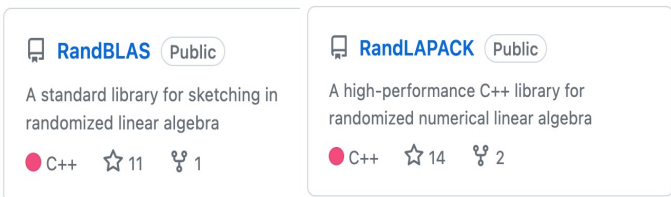
- ML-based tuning (Bayesian optimization, transfer learning, GNNs, etc.)
- ML + System techniques for enhancing tuning

Topic: Performance Analysis for New Workloads

Traditional HPC workloads



New HPC workloads

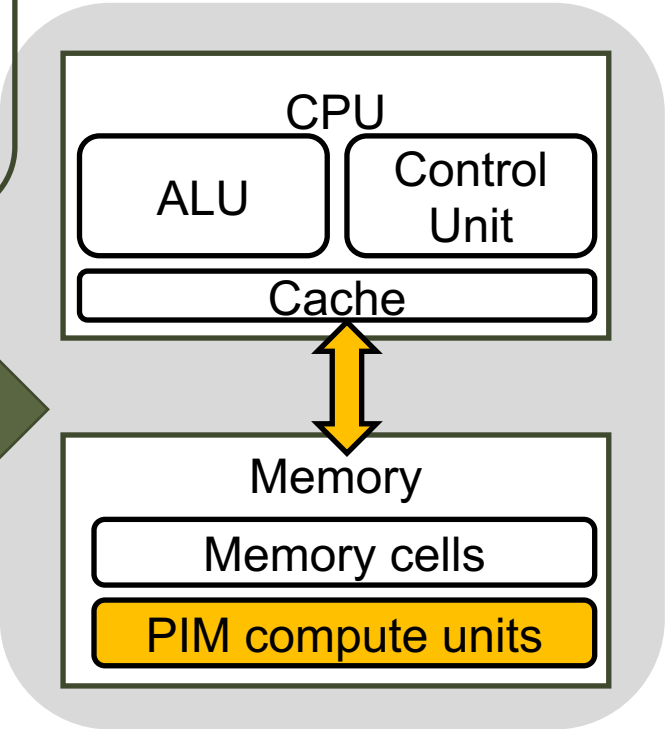


Understanding performance

- Applied ML to understand important HW events (performance counters, HW simulation)
- Performance profiling tool specialized for popular HPC libs
- Performance variability detection

* Processing-In-Memory

Topic: System Software for PIM



System software techniques

- Compiler/runtime techniques to accelerate HPC workloads using PIM
- Finding scenarios that can benefit from PIM



Thank you!

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