Vivek L. Kale

E-mail: vivek.lkale@gmail.com. **Web**: http://vlkale.github.io. **US Citizen**

Experience

Sandia National Laboratories Principal Member of Technical Staff II July 2024 - present
Sandia National Laboratories Senior Member of Technical Staff August 2022 - July 2024

- Owner of HPC Tools and Runtime Systems at Sandia Labs, including being a liaison for LLNL Performance Tools and maintainer for Kokkos Tools.
- Sandia Rep and contributor to OpenMP specification and MPI forum as Sandia Representative.

Brookhaven National Laboratory Computational Scientist May 2019 - August 2022

- Designed and implemented OpenMP user-defined multiGPU scheduling for LLVM to improve within-node load balancing of AI and scientific applications.
- Developed benchmarks and evaluated OpenMP implementations on Exascale supercomputers.
- Represented Brookhaven National Laboratory in the OpenMP Architecture Review Board.

Charmworks, Inc. Software Developer June 2018 - April 2019

- Conducted research and development for User-defined Loop Schedules (UDS) in OpenMP.
- Integrated OpenMP UDS loop scheduling strategies into Charm++'s CkLoop.

Education

B.S., Computer Science, 2007, University of Illinois at Urbana-Champaign
Ph.D., Computer Science, 2015, University of Illinois at Urbana-Champaign

Publications

1. Vivek Kale, Hanru Yan, Shyamali Mukherjee, Jackson Mayo, Keita Teranishi, Richard Rutledge and Alessandro Orso. *Toward Automated Detection of Portability Bugs in Kokkos Parallel Programs*. 8th International Workshop on Software Correctness for HPC Applications, SC24. November 18, 2024.
2. Kale, V., Lu, W., Curtis, A., Malik, A. M., Chapman, B., Hernandez, O. (2020). Toward supporting multi-gpu targets via taskloop and user-defined schedules. IWOMP 2020. September 2020. Virtual.
3. Amanda Randles, Vivek Kale, Jeff Hammond, William D. Gropp and Efthimios Kaxiras. ***Performance Analysis of the Lattice Boltzmann Model Beyond Navier-Stokes***. IPDPS 2013. May 2013. Boston, USA.
4. Simplice Donfack, Vivek Kale, Laura Grigori and William D. Gropp. ***Hybrid Static/Dynamic Scheduling for Already Optimized Dense Matrix Factorizations***. IPDPS 2012. May 2012. Shanghai, China.

Projects

1. **LLVM's OpenMP**: LLVM OpenMP with user-defined schedules and OpenMP multi-GPU support. *Repo*: `https://github.com/sollve/openmp-rts`
2. **Kokkos/C++**: Kokkos Tools and runtime systems for C++. *Repo*: `https://github.com/kokkos/kokkos-tools`

Technical Skills

Languages: C, C++, python, Fortran, bash, csh, VHDL, Matlab, Java;
Libraries: OpenMP (gomp, llvm), CUDA, Kokkos, HIP, POSIX threads (Pthreads), MPI (mpich), OpenACC (pgi), Globus Toolkit;
Tools: hpcToolkit, PMPI, ompt, nvtx, NVIDIA Nsight, Intel VTune, clang-tidy, KLEE, gprof, gdb, docker;
Utilities: git, cmake, spack, vi, clang-format, gnuplot, emacs, autoconf, LaTeX;
Platforms: NVIDIA A100, AMD MI300, Intel Xeon Phi, IBM Power, Cerebras WSE