

MOHAMMED ALFARHAN

Postdoctoral Research Associate, Innovative Computing Laboratory
University of Tennessee, Knoxville

farhan@icl.utk.edu
(+1) (865) 801-4488
farhanma.github.io
github.com/farhanma
bitbucket.org/farhanma

Education	King Abdullah University of Science and Technology , Saudi Arabia Ph.D., Computer Science. Advisor: David E. Keyes DISSERTATION – Unstructured Computations on Emerging Architectures	Aug 2014 – May 2019
	King Abdullah University of Science and Technology , Saudi Arabia M.Sc., Computer Science	Aug 2012 – Dec 2013
	King Faisal University , Saudi Arabia B.Sc., Computer Science	Aug 2007 – Feb 2012
Experience	University of Tennessee , Knoxville, US. Postdoctoral Research Associate Director: Jack Dongarra Research on developing numerical software libraries for solving linear algebra problems at scale	Jun 2019 - Present
	Saudi Electricity Company , Saudi Arabia. Software Engineer Developed distributed systems to monitor and detect anomalies in the reading meters	May 2012 - Aug 2012
	Saudi Aramco , Saudi Arabia. Software Engineer Intern Developed a distributed key-value store system to monitor IT incidents and infrastructure change requests	Summer 2011
	Saudi Aramco , Saudi Arabia. Software Engineer Intern Developed a database system to collect and log reports on IT problems for further processing with ease	Summer 2010
Books	<ol style="list-style-type: none">1. <i>High Performance Computing</i> Mohammed A. Al Farhan and David E. Keyes Under preparation, SIAM Press 2022 https://ecrc.github.io/hpc/	
Research	<ol style="list-style-type: none">1. <i>ExaBEM: Exascale Boundary Element Method Solver for Acoustic Simulation</i> Mohammed A. Al Farhan, Hakan Bagci, and David E. Keyes To be submitted, SC 2020 https://ecrc.github.io/ExaBEM/2. <i>GPU-Optimized Unstructured Computations</i> Mohammed A. Al Farhan and David E. Keyes To be submitted, TPDS 2020 https://ecrc.github.io/KFUN3D/3. <i>MAGMA Templates for Scalable Linear Algebra on Emerging Architectures</i> Mohammed A. Al Farhan, Ahmad Abdelfattah, Stanimire Tomov, Mark Gates, Ichitaro Yamazaki, Dalal Sukkari, Azzam Haidar, Robert Rosenberg, and Jack Dongarra International Workshop on Performance, Portability and Productivity in HPC (P3HPC), 2019 https://icl.utk.edu/magma/4. <i>Extreme Scale FMM-accelerated Boundary Integral Equation Solver for Wave Scattering</i> Mustafa Abduljabbar, Mohammed A. Al Farhan, Noha Al-Harthi, Rui Chen, Rio Yokota, Hakan Bagci, and David E. Keyes SIAM Journal on Scientific Computing (SISC), 2019 https://ecrc.github.io/BEMFMM/5. <i>Optimizations of Unstructured Aerodynamics Computations for Many-core Architectures</i> Mohammed A. Al Farhan and David E. Keyes IEEE Transactions on Parallel and Distributed Systems (TPDS), 2018	

6. *Performance Evaluation of Computation and Communication Kernels of the Fast Multipole Method on Intel Manycore Architecture*
Mustafa Abduljabbar, **Mohammed A. Al Farhan**, Rio Yokota, and David E. Keyes
International European Conference on Parallel and Distributed Computing (Euro-Par), 2017
7. *Unstructured Computational Aerodynamics on Many Integrated Core Architecture*
Mohammed A. Al Farhan, Dinesh K. Kaushik, and David E. Keyes
Elsevier Parallel Computing Journal (PARCO), 2016
8. *An Algorithm for Reduct Cardinality Minimization*
Hassan AbouEisha, **Mohammed A. Al Farhan**, Igor Chikalov, and Mikhail Moshkov
IEEE International Conference on Granular Computing (GrC), 2013
<https://farhanma.github.io/reduct/>

Services

Served as a peer reviewer for the *IEEE Cluster 2016*, *PLOS One 2018*, *International Journal of High Performance Computing Applications (IJHPCA) 2018*, *IEEE International Parallel & Distributed Processing Symposium (IPDSPS) 2019*, and *ACM Transactions on Parallel Computing (TOPC) 2019*

Teaching

AMCS 312: High Performance Computing. Teaching Assistant (TA) for David E. Keyes

- King Abdullah University of Science and Technology, Saudi Arabia
 - Fall 2014, Fall 2015, Fall 2016, Fall 2017, and Fall 2018
- Saudi Aramco, Saudi Arabia
 - Fall 2018
- Blue Waters Online Courses
 - Fall 2016 [Introduction to High Performance Computing]
- KAUST Visualization and Supercomputing Summer School, Saudi Arabia
 - Summer 2016 [Introduction to Portable, Extensible Toolkit for Scientific Computation (PETSc)]

Talks

Slides available at <https://speakerdeck.com/farhanma>

1. *MAGMA Templates for Scalable Linear Algebra on Emerging Architectures*
 - (a) Workshop on Performance, Portability and Productivity in HPC, 2019, Denver, Colorado, USA
2. *Unstructured Computations on Emerging Architectures*
 - (a) SIAM Conference on Computational Science and Engineering, 2019. Spokane, Washington, USA
3. *BEMFMM: An Extreme Scale FMM-Accelerated BIE Solver for Wave Scattering*
 - (a) SIAM Conference on Computational Science and Engineering, 2019. Spokane, Washington, USA
 - (b) Intel eXtreme Computing User Group (IXPUG) Meeting, 2018. KAUST, KSA
 - (c) SIAM Conference on Parallel Processing for Scientific Computing, 2018. Tokyo, Japan
4. *Optimizations of Unstructured Aerodynamics Computations for Intel Knights Landing Architecture*
 - (a) Intel eXtreme Computing User Group (IXPUG) Meeting, 2018. KAUST, KSA
 - (b) SIAM Conference on Parallel Processing for Scientific Computing, 2018. Tokyo, Japan
 - (c) Intel HPC Developer Conference, 2017. Denver, Colorado, USA
 - (d) Fully Predictive Complex Computational Fluid Dynamics Workshop, 2017. KAUST, KSA
 - (e) High Performance Computing Saudi Arabia (HPC Saudi) Conference, 2017. KAUST, KSA
Received best poster award
 - (f) SIAM Conference on Computational Science and Engineering, 2017. Atlanta, Georgia, USA
 - (g) Scalable Hierarchical Algorithms for eXtreme Computing Workshop, 2017. KAUST, KSA
5. *Performance Evaluation of Fast Multipole Method on Intel Manycore Architecture*
 - (a) International European Conference on Parallel and Distributed Computing (Euro-Par), 2017

(b) HPC in Asia Poster Competition, International Supercomputing Conference (ISC), 2017

6. *Implicit Unstructured Computational Aerodynamics on Many-Integrated Core Architecture*

(a) International Conference on Parallel Computational Fluid Dynamics, 2014. Trondheim, Norway

(b) Scalable Hierarchical Algorithms for eXtreme Computing workshop, 2014. KAUST, KSA

Programming

LANGUAGES – C/C++, Python, Java, Shell Script, MATLAB, and L^AT_EX

MODELS – x86 Compiler Intrinsics, OpenMP, pThreads, TBB, CUDA, and MPI

TOOLS – Make, CMake, Autotools, perf tools, Valgrind, and Git