

Mohammed Al Farhan

<https://farhanma.github.io>

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EDUCATION

- King Abdullah University of Science and Technology** 2014-2019
PhD, Computer Science
Topic: [Unstructured Computations on Emerging Architectures](#)
Advisor: David E. Keyes
- King Abdullah University of Science and Technology** 2012-2013
MSc, Computer Science
- King Faisal University** 2007-2012
BSc, Computer Science

RESEARCH EXPERIENCE

- Postdoctoral Researcher, University of Tennessee, Knoxville** 2019-Present
• Research on developing distributed multi-GPU software systems for computing numerical linear algebra problems at scale (with Jack Dongarra)
- Graduate Researcher, KAUST** 2012-2019
• Developed performance-centric algorithms for high performance computing, in the context of unstructured grid PDEs and the Fast Multipole Method (with David E. Keyes)
- Directed Research, KAUST** Spring 2013
• Developed novel combinatorial algorithms based on dynamic programming for multi-pruning of decision trees (with Mikhail Moshkov)

INDUSTRIAL EXPERIENCE

- Co-founder, RoboCrop Systems** 2017-2019
• RoboCrop Systems is a startup initiative offering automated farming solutions by using robotics and advanced sensing
- Software Engineer, Saudi Electricity Company** 2012
• Developed a smart system to detect anomalies in the reading meters
- Software Engineer Intern, Saudi Aramco** Summer 2011
• Developed a distributed key-value store system to track IT change requests
- Software Engineer Intern, Saudi Aramco** Summer 2010
• Developed a database management system to log IT reported incidents

TEACHING EXPERIENCE

- Teaching Assistant, KAUST** 2014-2018
• High Performance Computing course (instructor: David E. Keyes)
– KAUST AMCS 312: Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018
– UIUC Blue Waters Online Courses Intro2HPC: Fall 2016
– Saudi Aramco Intro2HPC: Fall 2018

PUBLICATIONS

- Journal Articles**
- **M. Al Farhan**, A. Abdelfattah, S. Tomov, M. Gates, D. Sukkari, A. Haidar, R. Rosenberg, and J. Dongarra. Magma Templates for Scalable Linear Algebra on Emerging Architectures, *IJHPCA* 2020
 - M. Abduljabbar, **M. Al Farhan**, N. Al-Harthi, R. Chen, R. Yokota, H. Bagci, and D. Keyes. [Extreme Scale FMM-Accelerated Boundary Integral Equation Solver for Wave Scattering](#), *SISC* 2019
<https://ecrc.github.io/bemfmm/>
 - **M. Al Farhan** and D. Keyes. [Optimizations of Unstructured Aerodynamics Computations for Many-core Architectures](#), *IEEE TPDS* 2018
<https://ecrc.github.io/kfun3d/>
 - **M. Al Farhan**, D. Kaushik, and D. Keyes. [Unstructured Computational Aerodynamics on Many Integrated Core Architecture](#), *Parallel Computing* 2016

Conference Papers

- M. Abduljabbar, **M. Al Farhan**, R. Yokota, and D. Keyes. [Performance Evaluation of Computation and Communication Kernels of the Fast Multipole Method on Intel Manycore Architecture](#), *Euro-Par 2017*
- H. AbouEisha, **M. Al Farhan**, I. Chikalov, and M. Moshkov. [An Algorithm for Reduct Cardinality Minimization](#), *IEEE GrC 2013*
<https://farhanma.github.io/MinReduct/>

Technical Reports

- M. Gates, **M. Al Farhan**, A. Charara, J. Kurzak, D. Sukkari, A. YarKhan, and J. Dongarra. [SLATE Working Note 13: Implementing Singular Value and Symmetric/Hermitian Eigenvalue Solvers](#), *Innovative Computing Laboratory Technical Report ICL-UT-19-07*, April 2020
- M. Gates, A. Charara, A. YarKhan, D. Sukkari, **M. Al Farhan**, and J. Dongarra. [SLATE Working Note 14: Performance Tuning SLATE](#), *Innovative Computing Laboratory Technical Report ICL-UT-20-01*, January 2020
- A. Charara, M. Gates, J. Kurzak, A. YarKhan, **M. Al Farhan**, D. Sukkari, and J. Dongarra. [SLATE Working Note 11: SLATE Developers' Guide](#), *Innovative Computing Laboratory Technical Report ICL-UT-19-02*, April 2020

PROGRAMMING

- **Languages:** C/C++, Python, Java, Unix Shell, MATLAB, L^AT_EX
- **Models:** MPI, OpenMP, CUDA, pThreads, TBB, Intrinsics
- **Tools:** Make, CMake, Autotools, perf, Valgrind, gdb, git

ORAL/POSTER PRESENTATIONS

- Unstructured Computations on Emerging Architectures
 - SIAM CSE 2019, Spokane, Washington
- BEMFMM: An Extreme Scale FMM-Accelerated BIE Solver for Wave Scattering
 - SIAM CSE 2019, Spokane, Washington
 - Intel IXPUG 2018, KAUST
 - SIAM PP 2018, Tokyo, Japan
- Optimizations of Unstructured Aerodynamics Computations for Intel KNL Hardware
 - Intel IXPUG 2018, KAUST
 - SIAM PP 2018, Tokyo, Japan
 - Intel HPC Developer Conference 2017, Denver, Colorado
 - PCCFD Workshop 2017, KAUST
 - HPC Saudi Conference 2017, KAUST [best poster award]
 - SIAM CSE 2017, Atlanta, Georgia
 - SHAXC-3 Workshop 2017, KAUST
- Performance Evaluation of Fast Multipole Method on Intel Manycore Architecture
 - Euro-Par 2017, Santiago de Compostela, Spain
 - ISC 2017, Frankfurt, Germany
- Implicit Unstructured Computational Aerodynamics on MIC Architecture
 - ParCFD 2014, Trondheim, Norway
 - SHAXC-2 Workshop 2014, KAUST

SERVICES

- **Reviewer:** ACM/IEEE SC 2015, ACM PPoPP 2016, Euro-Par 2016, IEEE Cluster 2016, PLOS One 2018, IJHPCA 2018, IEEE IPDSPS 2019, ACM TOPC 2019, Parallel Computing 2019, ACM PASC 2020, and Parallel Computing 2020
- **Member:** KAUST IEEE Student Chapter (2012-2013), KAUST Graduate Council (2012-2014), KAUST ACM/SIAM Student Chapter (2012-2019), and KAUST Code Clinic (2014-2019)
- **Lecturer:** Gave several tutorials on: Python Programming (Spring 2014 and 2015), Fundamentals of High Performance Computing (Summer 2014 and 2015), PETSc: Portable, Extensible Toolkit for Scientific Computation (Summer 2016), and Version Control using Git (Fall 2020)