

Mohammed Al Farhan

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EDUCATION

King Abdullah University of Science and Technology (KAUST) 2014-2019
PhD, Computer Science
Topic: [Unstructured Computations on Emerging Architectures](#)
Advisor: David E. Keyes

King Abdullah University of Science and Technology (KAUST) 2012-2013
MSc, Computer Science

King Faisal University 2007-2012
BSc, Computer Science

RESEARCH EXPERIENCE

Postdoctoral Researcher, KAUST 2020-Present
• Research on data-sparse approximations of non-sparse matrices (with David E. Keyes)

Postdoctoral Researcher, University of Tennessee, Knoxville 2019-Present
• Research on distributed, GPU-accelerated dense linear algebra (with Jack Dongarra)

Graduate Researcher, KAUST 2012-2019
• Research on unstructured grid PDEs and fast multipole method (with David E. Keyes)

Directed Research, KAUST Spring 2013
• Research on combinatorial machine learning (with Mikhail Moshkov)

INDUSTRIAL EXPERIENCE

Co-founder, RoboCrop 2017-2019
• RoboCrop is a startup initiative that develops automated farming solutions

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 ASSISTANTSHIPS

• AMCS 312 High Performance Computing course (with David E. Keyes)
Fall 2013, Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018

• Introduction to High Performance Computing (with David E. Keyes)
Fall 2016 (Blue Waters online courses, funded by US NSF at UIUC)
Fall 2018 (Saudi Aramco EXPEC Advanced Research Center)

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

• **M. Al Farhan** and D. Keyes. [Optimizations of Unstructured Aerodynamics Computations for Many-core Architectures](#), *IEEE TPDS* 2018

- **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

Technical Reports

- M. Gates, A. Charara, J. Kurzak, A. YarKhan, **M. Al Farhan**, D. Sukkari, and J. Dongarra. [SLATE Working Note 10 – SLATE Users’ Guide](#), *Innovative Computing Laboratory Technical Report ICL-UT-19-01*, July 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
- 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

PROGRAMMING

- **Languages:** C/C++, Python, Java, Unix Shell, Matlab, L^AT_EX
- **Models:** MPI, OpenMP, CUDA, pThreads

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 and 2020, ACM PASC 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)