

# 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 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 EXPERIENCE

- Teaching Assistant, KAUST** 2014-2018  
• AMCS 312 High Performance Computing course (instructor: David E. Keyes)

## 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*  
[https://bitbucket.org/icl/magma\\_template](https://bitbucket.org/icl/magma_template)
  - 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

- 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 SKILLS

- C/C++, Python, Java, MPI, CUDA, OpenMP, Unix Shell, Matlab, L<sup>A</sup>T<sub>E</sub>X

#### 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)