Mohammed Al Farhan

https://farhanma.github.io
farhan@icl.utk.edu
mohammed.farhan@kaust.edu.sa

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 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*
- 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, LaTeX
- **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)