

Mohammed Al Farhan

mohammed.farhan@kaust.edu.sa / farhanma.github.io

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 scalable algorithms exploiting data sparsity (with David E. Keyes)
	Postdoctoral Researcher, University of Tennessee, Knoxville 2019 — 2021 • Research on distributed, GPU-accelerated dense linear algebra (with Jack Dongarra)
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 (KAUST) – 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 , <i>IJHPCA 2020</i> • 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 , <i>SISC 2019</i> • M. Al Farhan and D. Keyes. Optimizations of Unstructured Aerodynamics Computations for Many-core Architectures , <i>IEEE TPDS 2018</i> • M. Al Farhan , D. Kaushik, and D. Keyes. Unstructured Computational Aerodynamics on Many Integrated Core Architecture , <i>Parallel Computing 2016</i>
	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 , <i>Euro-Par 2017</i> • H. AbouEisha, M. Al Farhan , I. Chikalov, and M. Moshkov. An Algorithm for Reduct Cardinality Minimization , <i>IEEE GrC 2013</i>
	Technical Reports • A. Abdelfattah, M. Al Farhan , C. Brown, M. Gates, D. Sukkari, A. YarKhan, and J. Dongarra. SLATE port to AMD and Intel platforms , SWAN No. 16 (ICL-UT-21-01), <i>ICL, UTK</i> , Apr 2021

- A. YarKhan, **M. Al Farhan**, D. Sukkari, M. Gates, and J. Dongarra. [SLATE Performance Report: Updates to Cholesky and LU Factorizations \(ICL-UT-20-14\)](#), *ICL, UTK*, Oct 2020
- A. Charara, M. Gates, J. Kurzak, A. YarKhan, **M. Al Farhan**, D. Sukkari, and J. Dongarra. [SLATE Developers' Guide, SWAN No. 11 \(ICL-UT-19-02\)](#), *ICL, UTK*, Aug 2020
- M. Gates, A. Charara, J. Kurzak, A. YarKhan, **M. Al Farhan**, D. Sukkari, and J. Dongarra. [SLATE Users' Guide, SWAN No. 10 \(ICL-UT-19-01\)](#), *ICL, UTK*, Jul 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 \(ICL-UT-19-07\)](#), *ICL, UTK*, Apr 2020
- M. Gates, A. Charara, A. YarKhan, D. Sukkari, **M. Al Farhan**, and J. Dongarra. [SLATE Working Note 14 Performance Tuning SLATE \(ICL-UT-20-01\)](#), *ICL, UTK*, Jan 2020

PROGRAMMING

- **Languages:** C/C++, Python, Java, POSIX Shell, MATLAB, \LaTeX
- **Models:** MPI, OpenMP, CUDA, POSIX Threads, TBB, ROCm, SYCL/DPC++

ORAL/POSTER PRESENTATIONS

- HiCMA: Hierarchical Computations on Manycore Architectures
 - oneAPI Developer Summit at SC 2021, St. Louis, MO
 - Intel IXPUG Annual Conference 2021, Austin, TX
- Tile Low-Rank Matrix-Vector Multiplication for Scientific Applications
 - oneAPI Developer Summit at SC 2021, St. Louis, MO
 - Intel IXPUG Annual Conference 2021, Austin, TX
- SLATE: Software for Linear Algebra Targeting Exascale
 - ECP Annual Meeting 2020, Houston, TX
- 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

SERVICE AND OUTREACH

- **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, Parallel Computing 2020, ICCS 2021, Euro-Par 2021, ACM/IEEE SC 2021, IEEE Cluster 2021
- **Artifact Evaluator:** ACM PPOPP 2016, ACM/IEEE SC 2021
- **Vice president:** KAUST IEEE Student Chapter (2012-2013), KAUST ACM Student Chapter (2012-2015), and KAUST SIAM Student Chapter (2012-2017)
- **Treasurer:** KAUST SIAM/ACM Student Chapter (2017-2019)
- **Member:** KAUST Graduate Council: Academic and Research Committee (2012-2013) and University Relation Committee (2013-2014)
- **Co-organizer:** KAUST Code Clinic (2014-2019), Python Programming Camp (Spring 2014 and 2015), and Scientific Software Engineering Lecture Series: 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)