Mohammed Al Farhan

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EDUCATION

2014 — 2019	**King Abdullah University of Science and Technology** Dissertation: Unstructured Computations on Emerging Architectures Committee: David E. Keyes, Mikhail Moshkov, Hakan Bagci, Markus Hadwiger, and Edmond Chow	*PhD, Computer Science*
2012 — 2013	**King Abdullah University of Science and Technology**	*MSc, Computer Science*
2007 — 2012	**King Faisal University**	*BSc, Computer Science*

EXPERIENCE

2022 —	**King Abdullah Petroleum Studies and Research Center** Develop analytical models for energy, economy and climate, and deploy them in production	*Senior Data Scientist*
2020 — 2022	**King Abdullah University of Science and Technology** Research on scalable algorithms exploiting data sparsity (with David E. Keyes)	*Postdoctoral Researcher*
2019 — 2021	**University of Tennessee, Knoxville** Research on distributed, GPU-accelerated dense linear algebra (with Jack Dongarra)	*Postdoctoral Researcher*
2012	**Saudi Electricity Company** Developed a smart system to detect anomalies in the reading meters	*Software Engineer*
Summer 2011	**Saudi Aramco** Developed a distributed key-value store system to track IT change requests	*Software Engineer Intern*
Summer 2010	**Saudi Aramco** Developed a database management system to log IT reported incidents	*Software Engineer Intern*

PUBLICATION

Journal Articles

1. **M. Al Farhan**, H. Ltaief, K. Akbudak, R. Alomairy, Y. Hong, H. Ibeid, L. Gatineau, D. Keyes. HiCMA: Design of a Modern Distributed and GPU-Accelerated Tile Low-Rank Linear Algebra Framework, *ACM TOMS 2022*
2. **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*
3. 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*
4. **M. Al Farhan** and D. Keyes. Optimizations of Unstructured Aerodynamics Computations for Many-core Architectures, *IEEE TPDS 2018*
5. **M. Al Farhan**, D. Kaushik, and D. Keyes. Unstructured Computational Aerodynamics on Many Integrated Core Architecture, *Parallel Computing 2016*

Conference Papers

6. 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*
7. H. AbouEisha, **M. Al Farhan**, I. Chikalov, and M. Moshkov. An Algorithm for Reduct Cardinality Minimization, *IEEE GrC 2013*

Technical Reports

8. 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), *ICL, UTK*, Apr 2021
9. 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
10. 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
11. 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
12. 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
13. 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 SKILLS

- **Languages:** C/C++, Python, Java, POSIX Shell, Perl, MATLAB, SQL, LaTeX
- **Technologies:** MPI, OpenMP, CUDA, POSIX Threads

TEACHING ASSISTANTSHIP

- AMCS 312 High Performance Computing course (with David E. Keyes)
  - Fall 2013, Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018 Fall 2019 (KAUST)
  - Fall 2016 (Blue Waters online courses, funded by US NSF at UIUC)
  - Fall 2018 (Saudi Aramco EXPEC Advanced Research Center)

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)