

Mohammed A. Al Farhan

Ph.D. CANDIDATE IN COMPUTER SCIENCE

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Research Interests

My research interests are mainly in High-Performance Computing (HPC) algorithms, architectures, and applications in Computational Science and Engineering (CS&E).

Keywords: High-performance computing, Computational fluid dynamics, Computational science and engineering, Nonlinear preconditioning, Performance modeling and optimizations, Scientific simulation, Parallel & Distributed Systems, and many- & multi-core emerging HPC architecture.

Education

[King Abdullah University of Science and Technology](#) THUWAL, SAUDI ARABIA
Ph.D., in COMPUTER SCIENCE AUG'14 - PRESENT

- THESIS TITLE: Parallel Implicit Unstructured Computations on Emerging Multi- and Many-Core HPC Architectures, ADVISOR: Professor David E. Keyes.

[King Abdullah University of Science and Technology](#) THUWAL, SAUDI ARABIA
M.Sc., COMPUTER SCIENCE SEP'12 - DEC'13

- COURSEWORK: Algorithm analysis and design, Parallel programming paradigms (MPI, OpenMP, CUDA, and OpenACC), Programming languages, Combinatorial machine learning, High-performance computing I & II (algorithms, architectures, and applications), Computing systems and concurrency (Operating Systems), and Data analytics (artificial intelligence, data mining, and machine learning).

[King Faisal University](#) AL-HASA, SAUDI ARABIA
B.Sc., COMPUTER SCIENCE SEP'07 - FEB'12

- SENIOR PROJECT: Developed a system for using a programmable RFID chips to facilitate access to classrooms. The project was supplemented with an implementation of a web system for the end-user interface and a client application for the communication between the RFID and the web system.

Research Experience

[King Abdualлах University of Science and Technology](#) THUWAL, SAUDI ARABIA
ADVISED BY Professor David E. Keyes NOV'16 - PRESENT

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[King Abdualлах University of Science and Technology](#) THUWAL, SAUDI ARABIA
ADVISED BY Professor David E. Keyes AUG'14 - OCT'16

- Exploring unstructured PDE-based computations on highly parallel SIMD-style emerging multi- and many-core architectures via studying several aggressive optimization means to extract instruction-, vector-, and thread-level parallelism for a complex and large-scale PDE-based, CFD computations.

[King Abdualлах University of Science and Technology](#) THUWAL, SAUDI ARABIA
ADVISED BY Professor David E. Keyes JUL'13 - JUL'14

- Investigated how hybrid programming paradigm (MPI+OpenMP) on unstructured PDE-based CFD codes can exploit many integrated core architecture with

upwards of 60 cores per node and 4 threads per core.

[King Abdullah University of Science and Technology](#) THUWAL, SAUDI ARABIA
ADVISED BY Professor Mikhail Moshkov JAN'13 - JUN'13

- Designed and implemented a classification algorithm that constructs classifiers for supervised machine learning training sets using decision trees and decision rule systems.

Professional Experience

[Saudi Electricity Company](#) RIYADH, SAUDI ARABIA
INFORMATION SYSTEM ANALYST MAY'12 - AUG'12

- Developed a software system based on intelligent algorithms that detected anomalies such as malfunctions, tampers, and manipulations in the reading meters of customers.

[Saudi Aramco](#) DHAHRAN, SAUDI ARABIA
INTERN, SOFTWARE DEVELOPER JUL'11 - SEP'11

- Implemented a software system to keep track of all IT incidents and problems, and then, updates the concerned parties on the current status of the said problem, automatically effectively reducing managerial bottlenecks.

[Saudi Aramco](#) DHAHRAN, SAUDI ARABIA
INTERN, SOFTWARE DEVELOPER JUL'10 - AUG'10

- Programmed an interface that collects reports on IT problems and logs them into a unified database repository where they can always be recalled for further processing with ease.

Teaching Experience

Teaching Assistant (TA) for High-Performance Computing (AMCS/CS 312).
KAUST, FALL'14; FALL'15; FALL'16.

Journal Publications

Al Farhan, M. A., Kaushik, D. K., and Keyes, D. E. Unstructured Computational Aerodynamics on Many Integrated Core Architecture. *Parallel Computing* (2016), In press.

Conference Publications

AbouEisha, H., **Al Farhan, M.**, Chikalov, I. and Moshkov, M. An algorithm for reduct cardinality minimization. *grc*, pp.1-3, 2013 IEEE International Conference on Granular Computing (GrC).

Conference Presentations

Al Farhan, M. A. and Keyes, D. E. Implicit Unstructured Computational Aerodynamics on Many-Integrated Core Architecture. 26th Conference on Parallel Computational Fluid Dynamics. May 2014. Trondheim, Norway.

Poster Presentations

Al Farhan, M. A., Kaushik D. K., and Keyes, D. E. Unstructured Computational Aerodynamics on Many Integrated Core Architecture. Scalable Hierarchical Algorithms for eXtreme Computing (SHAXC)-3 Workshop. May 2016. KAUST, Thuwal, Saudi Arabia.

Al Farhan, M. A., Kaushik D. K., and Keyes, D. E. Unstructured Computational Aerodynamics on Many Integrated Core Architecture. ECRC Scientific Advisory Board Review Meeting. October 2015. KAUST, Thuwal, Saudi Arabia.

Al Farhan, M. A. and Keyes, D. E. Implicit Unstructured Computational Aerodynamics on Many-Integrated Core Architecture. Scalable Hierarchical Algorithms

for eXtreme Computing (SHAXC)-2 Workshop. May 2014. KAUST, Thuwal, Saudi Arabia.

Technical Skills C/C++, Java, Python, FORTRAN, PHP, JavaScript, MPI, OpenMP, MATLAB, PETSc, MeTiS, \LaTeX .

Professional Societies Student member of SIAM, ACM, and IEEE.
Served as a peer reviewer for the IEEE Cluster 2016, and IJHPCA journal 2015.

References **Professor David E. Keyes**
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