Arwa AlAnqary

Massachusetts Institute of Technology, Cambridge, MA

6178884777 • alanqary@mit.edu • alanqary.com

Education

Massachusetts Institute of Technology
M.Sc. in Computational Science and Engineering, GPA: 5.0/5.0 *2019-2021(expected)*

Alfaisal University
B.S. in Mechanical Engineering, GPA: 4.0/4.0 *2013-2017*
First Class Honors, valedictorian of the 2017 class.

Work Experience

Center For Complex Systems (CCS) at KACST and MIT
Researcher *2017–2019*
Worked on interdisciplinary research projects that tackled problems in time series forecasting, uncertainty quantification, and connected computational modeling. Engaged with high-ranking stakeholders in the energy sector in Saudi Arabia for research utilization and commercialization.

PricewaterhouseCoopers (PwC)
Consultant *2017*
Worked on developing strategic initiatives, financial models, and public-private partnership models for clients in the agri-food sector in Saudi Arabia.

Alfaisal University
Undergraduate Research Assistant *2014–2017*
Worked as a research assistant in the Department of Mechanical Engineering under the supervision of Professor Zhao Yong and the Department of Mathematics under the supervision of Professor Boumediene Hamzi.

King Abdullah University of Science and Technology (KAUST)
Research Intern *2012*
Worked at the Computational Physics and Material Science Lab on simulating the properties of nano-materials under the supervision of Professor Udo Schwingenschlögl.

Research Projects

Change point Detection in Time Series Data using Subspace Methods **MIT**
PI: Devavrat Shah *2020–present*

- Developing an algorithm for the detection of change points in time series based on changes in the underlying low-rank subspace of the data
- Proving theoretical bounds on the performance of the algorithm

Tools & Skills: *CUSUM Hypothesis Testing, low-rank Matrix Approximation, Python, MATLAB*

Zorro: A system for addressing inefficiencies in the online advertisement market **MIT**
PI: Devavrat Shah *2019–2020*

- Developed a chrome extension to increase the browsing privacy of the user through blocking ads and third-party cookies
- Proposed a new model for the value of data in the context of the online advertising market

Tools & Skills: *Recommender Systems, HTML, JavaScript, Flask*

Time Series Analysis Using Matrix Estimation **KACST - MIT**
PI: Devavrat Shah *December 2017–2019*

- Implemented algorithms for time series forecasting and imputation using techniques of matrix estimation
- Proposed and tested a modification to this algorithm to improve the imputation accuracy in cases of consecutive missing values in the time series

Tools & Skills: *Time-series Analysis, Singular Value Decomposition, Matrix Estimation, Python, R*

Connected Intelligence Platform **KACST - MIT**
PI: Kamal Youcef-Toumi, Anas AlFaris, and David Karger *September 2017–2019*

- Investigated the challenges associated with model reusability and connectivity
- Formulated a Bayesian representation for an uncertainty propagation framework that allows for fast propagation of arbitrarily shaped input probability distributions through connected computational models

Tools & Skills: *Monte Carlo Methods, Bayesian Probability, UQLab*

Electricity Demand Forecasting **KACST - MIT**
PI: Devavrat Shah and Mansour Al Saleh *September 2017–2019*

- Developed a model for short-term electricity demand forecasting for different regions in Saudi Arabia
- Formulated a modified error measure to better reflect the monetary cost associated with errors in forecasting
- Contributed to the development of a commercial forecasting tool to allow decision-makers at the Saudi Electricity Company to use the output of this project for operational and investment decisions

Tools & Skills: *PCA, Lasso Regression, KNN, Python, MATLAB, Spark*

Seizure Detection **Alfaisal University**
PI: Boumediene Hamzi *October 2015– March 2016*

- Applied an algorithm based on maximum mean discrepancy to the problem of seizure detection in EEG signals
- Tested the performance of the algorithm on real-world datasets from Boston Children's Hospital

Tools & Skills: *Kernal Methods, MMD, MATLAB*

Elastic Properties of Living Cells **Alfaisal University**
PI: Zhao Yong *August 2014–April 2015*

- Created a computational model of the nano-indentation process on red blood cells to study the effect of chronic smoking on the elasticity of the cells
- Simulated the indentation experiment and validated the model output with the experimental results

Tools & Skills: *Finite Element Analysis, Ansys, SolidWorks*

Publications

Zhao Yong, Ibrahim N Muhsen, Mohamed Tarek Abdelaty, Muhammad U Zafar, **Arwa A AlAnqary**, Nourah A Alrubaiq, Samah F Alabbasi, Randa Alnounou, and Youssef Omaia Elakwah. Experimental and fem study of effect of smoking on red blood cells. *International Journal of Biological Engineering*, 2015.

Conference Presentations

Abdullah AlOmar, **Arwa AlAnqary**, Mansour AlSaleh, Devavrat Shah. An Adaptive Algorithm for Time-series Imputation Using Matrix Estimation Methods. *NBER-NSF Time Series Conference*, Hong Kong, 2019.

Boumediene Hamzi, Turky N AlOtaiby, Saleh AlShebeili, and **Arwa AlAnqary**. Preliminary Results on a Maximum Mean Discrepancy Approach for Seizure Detection. *International Conference on Health Informatics and Health Information Technology*, London, UK, 2018.

Working Papers

Kevin Vanslette, **Arwa AlAnqary**, Zeyad Al Awwad, Kamal Youcef-Toumi. Vectorized Uncertainty Propagation and Input Probability Sensitivity Analysis.

Engineering Projects

Thermal Stability of Lithium-Ion Batteries

- Used silver zirconia nano-particles as a novel cathode material in lithium-ion batteries.
- Studied its effect on improving the life and thermal stability of the batteries.

Design and Fabrication of Fuel Efficient Car Prototype

- Designed an ultra-light aluminum chassis for fuel efficient single-rider vehicle.
- Performed numerical analysis of the torsional rigidity of the proposed design.

Date Palm Tree Fiber Composite Material

- Used waste date-palm tree fiber as composite reinforcement in polymers.
- Studied the effect of treatment process on the mechanical properties of the fiber.

Honors and Awards

- Awarded KACST Graduate Scholarship covering full tuition and living stipends for both Master's and Ph.D. degrees, 2019 - 2025
- Awarded Ministry of Education Undergraduate Scholarship covering full tuition, 2013 - 2017
- Awarded best poster at Alfaisal University's Poster Competition, 2015
- Awarded best oral presentation at the Saudi Research Science Institute at KAUST, 2012

Professional Affiliations

- IEEE, Institute of Electrical and Electronic Engineers
- SIAM, Society for Industrial and Applied Mathematics

Technical Skills

- **Programming Languages:** Java, MATLAB, R, Python, Julia, JavaScript
- **Engineering Tools:** SolidWorks, QGIS, Material Studio, UQLab
- **Languages:** Arabic (native speaker), English (bilingual proficiency)