

**ABDULRAHMAN MOHAMMAD ALHARBI**

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## Education

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**Master of Science in Applied Mathematics**

King AbdulUllah University of Science and Technology (KAUST), Thuwal, Saudi Arabia

Graduated: **May 2019**

Thesis: ***On the  $L^p$ -integrability of Green's function for elliptic differential operators***

GPA: **3.49/4.0**

**Bachelor of Arts in Mathematics (with honor)**

Rutgers University, New Brunswick, NJ, United States

Graduated: **May 2017**

Major: **Mathematics**, Minor: **Physics**

GPA: **3.6/4.0**

## Professional Experience

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**• Teaching Assistant (February 2020 – Present)**

Department of Mathematics, Faculty of Science, Islamic University of Madinah

- courses (as an instructor): college algebra and trigonometry (fall 2020)
- courses (as an assistant): calculus (spring 2020)

### General Teaching and Work Experiences:

**• Teaching Assistant (Fall 2024)**

*KAUST Master's of Professional Studies in Artificial Intelligence for Ministry of Interior (MOI)*

KAUST & KAUST Academy, Riyadh/Thuwal, Saudi Arabia

- Assisted the primary instructor during problem-solving sessions for Linear Algebra and Calculus courses
- Ran Linear Algebra review and recitation sessions (in-person & on-line)
- Graded homework

**• Teaching Assistant (Summer 2024)**

*KAUST Master's of Professional Studies in Artificial Intelligence for Ministry of Interior (MOI)*

KAUST & KAUST Academy, Riyadh/Thuwal, Saudi Arabia

- Ran online lectures and problem-solving sessions for Linear Algebra
- Proctored and graded student exams

**• Teaching Assistant (Summer 2024)**

*Ministry of Interior (MOI) Bridging Program*

KAUST Academy, Thuwal, Saudi Arabia

- Helped professional MOI employee assimilate to the Master's program
- Assisted the primary instructor during problem-solving sessions for Linear Algebra course
- Ran Linear Algebra review and recitation sessions
- Proctored and graded students exams

- **Teaching Assistant** (*Summer 2024*)  
*Applied Mathematics 2: Graduate Course on PDEs and Their applications*  
 KAUST, Thuwal, Saudi Arabia
  - Held office hours and corresponded to student questions
  - Graded Homework
- **Mathematics Instructor** (*Summer 2023*)  
*Saudi Research Science Initiative (SRSI)*  
 KAUST Academy, Thuwal, Saudi Arabia
  - Gave a short course on geometry and vectors spaces
- **Teaching Assistant** (*Spring 2023*)  
*Numerical Methods for Differential Equations*  
 KAUST, Thuwal, Saudi Arabia
  - Held office hours and corresponded to student questions
  - Graded Homework
- **Statistics Instructor** (*Summer 2018*)  
*KAUST Scientific Summer Program for Secondary School Students*  
 KAUST, Thuwal, Saudi Arabia
  - Gave a crash course on combinatorics and statistics
  - Examined the students and assessed their improvement and performance
- **Peer-Mentor** (*Spring 2016*)  
*Calculus II: Sequences and series*  
 Rutgers University, New Brunswick, NJ, United States
  - Assisted in problem solving sessions and aided student solving complicated application questions in calculus
  - Held office hours and answered students' questions

## Skills

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### Computer Skills:

- Scientific Programming with Octave (M)
- Scientific Programming with Matlab (M)
- Java (B)
- Scientific Programming with Mathematica (B)
- Microsoft Office/LibreOffice (A)
- LaTeX (A)
- Operating Systems: Linux, Windows, Mac (A)
- Git (B)

### Technical and Professional Skills:

- Critical Thinking and Problem Solving
- Meeting Management

### Communication Skills:

- Fluent in Arabic and English
- Technical Report Writing
- Agenda Structuring and Record Preservation

## Training and Enrichment Programs

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- Spring 2017: Directed Reading Program (DRP) on Lie Groups and ODE Symmetries at Rutgers.
- Summer 2016: Internship on Calculus of Variation, Mathematica programming, and Partial Differential Equations (PDE) at KAUST.
- Winter 2016: KAUST Winter Enrichment Program (WEP)
  - special session: Workshop on Microcontrollers and Bluetooth communication.

- Spring 2015: Directed Reading Program (DRP) on Group Theory at Rutgers.
- Summer 2015: KAUST Enrichment Program on water pollutants research at the University of Texas.
- 2011, 2012, 2013: Training program for the Saudi team for the International Mathematical Olympiad.
- 2010: Toastmasters weekly program for high school students on meeting management and public speaking.

## Awards and Honors

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14. **CEMSE Dean's List Award**; King AbduUllah University of Science and Technology (KAUST), **2024**.
13. **First Place Team** in Team Competition, Garden State Undergrad Mathematics Conference, 2016.
12. (Split) **Fourth Place** in Individual Competition, Garden State Undergrad Mathematics Conference, 2016.
11. **Fourth Place Team** in Team Competition, Garden State Undergrad Mathematics Conference, 2015.
10. (Split) **Fifth Place** in Individual Competition, Garden State Undergrad Mathematics Conference, 2015.
9. **92% Percentile** in *Putnam Competition*, 2016.
8. **85% Percentile** in *Putnam Competition*, 2015.
7. **77% Percentile** in *Putnam Competition*, 2014.
6. **Bronze Medal**, International Mathematical Olympiad (IMO), 2013.
5. **Bronze Medal**, International Mathematical Olympiad (IMO), 2012.
4. **Bronze Medal**, Balkan Mathematical Olympiad (BMO), 2012.
3. **Second Place** (with Silver Medal), Gulf Mathematical Olympiad (GMO), 2012.
2. (Split) **Third Place** (with Bronze Medal), KFUPM Mathematical Olympiad, 2011.
1. **Third Place**, National Mathematical Olympiad, 2011.

## Presentations and Poster Sessions

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### Lecture Presentation:

- [3] Title: *A First-Order Mean-Field Game on a Bounded Domain with Mixed Boundary Conditions*  
Event: The **14th AIMS Conferenc** on Dynamical Systems, Differential Equations, and Applications  
Date: **17 December 2024**  
Host: **NYU Abu Dhabi**  
Location: ADNEC, **Abu Dhabi**, UAE
- [2] Title: *Mean-Field Games: Contemporary Topic in the Theory of Optimal Control*  
Event: The **Scientific Week** of the Islamic University  
Date: **13 February 2022**  
Host: **The Islamic University of Al-Madinah**– The *Department of Mathematics*  
Location: The Faculty of Science, IU, **Al-Madinah**, Saudi Arabia

- [1] Title: *Mean-Field Games: Contemporary Topic in the Theory of Optimal Control*  
Event: **1st AMCS Workshop for Higher Education Instructors**  
Date: **19 August 2021**  
Host: **KAUST**– The Office of *Strategic National Advancement*  
Location: KAUST, **Thuwal**, Saudi Arabia

### **Posters Presentation:**

- [2] Title: *On the Free Boundary of the Mean-field Game*  
Event: **The Long Time Behavior and Singularity Formation in PDEs: Part VII**  
Date: **14 December 2024**  
Host: **New York University Abu Dhabi (NUYAD)**, *SITE Center*  
Location: NYUAD, **Abu Dhabi**, UAE
- [1] Title: *Examining the Chemical Contaminants in Common Bottled Water Brands*  
Event: **KAUST Summer Research Program**  
Date: **21 August 2015**  
Host: **KAUST** and **University of Texas at Austin (UT Austin)**  
Location: UT Austin, **Austin**, the United States of America

### **Publications**

- [2] **A. M. Alharbi**, Diogo Gomes, Giuseppe Di Fazio, and Melih Ucer;  
*Regularity for Weak Solutions to First-Order Local Mean Field Games* (preprint), 2024  
<https://arxiv.org/abs/2411.15174>
- [1] **A. M. Alharbi**, Yuri Ashrafyan, and Diogo Gomes;  
*A First-Order Mean-Field Game on a Bounded Domain with Mixed Boundary Conditions* (preprint), 2025  
<https://arxiv.org/abs/2305.15952>