ABDULRAHMAN MOHAMMAD ALHARBI

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Education

Doctor of Philosophy in Applied Mathematics
King AbduUllah University of Science and Technology (KAUST)— Thuwal, Saudi Arabia
Graduated: ***ongoing***
Thesis: ***First-Order Mean-Field Games on Bounded Domains with Entry-Exit Flow Constrains and Contact-Set Condition***

Master of Science in Applied Mathematics
King AbduUllah 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

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

Professional Experience

- **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

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

- 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

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

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** 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