

Zeyad M. Manaa

(+966) 566-707-476, g202216800@kfupm.edu.sa, [LinkedIn](#), [Website](#)

Department of Aerospace Engineering,

King Fahd University for Petroleum and Minerals, Dhahran, 31261, Saudi Arabia

Research Interests

Data-driven modeling and control of dynamical systems – Control theory, and optimization – Model reduction, and feedback control of dynamical systems – Event-triggered control

Education

2023 – present	King Fahd University for Petroleum & Minerals (KFUPM) <i>M.Sc. in Aerospace Engineering</i> Current GPA: 3.875/4.0	Dhahran, Saudi Arabia
2022	University of Science and Technology at Zewail City (UST-ZC) <i>B.Sc. in Aerospace Engineering</i> Thesis: “Development of the software package for the attitude determination and control algorithm of a cube satellite” Cumulative GPA: 3.3/4.0	Giza, Egypt

Selected Publications and Patents

Conference Proceedings

1. **Manaa, Z.M.**, Elbalshy, M.R. and Abdallah, A.M. (2024). ‘Data-driven Discovery of The Quadrotor Equations of Motion Via Sparse Identification of Nonlinear Dynamics,’ *In AIAA SCITECH 2024 Forum*. Orlando, FL, USA. AIAA, (p. 1308). [[ArXiv](#)]
2. **Manaa, Z.M.**, Abdallah, A.M., Abido, M.A. and Ali, S.S.A. (2024). ‘Koopman-LQR for Quadrotor UAVs from Data,’ Accepted for publication in IEEE International Conference on Smart Mobility. [[ArXiv](#)]
3. Mohssen, M., Elkhodary, P., Badr, M., Sayegh, M., **Manaa, Z.M.** and Abdallah, A.M. (2025). ‘Optimum Configuration for Hovering N-Quadrotors Carrying a Slung Payload,’ Accepted at the AIAA SCITECH 2025 Forum.
4. Anafi, S., Najam, T., Pampor, A., Azhar, S., **Manaa, Z.M.** and Abdallah, A.M., (2025). ‘Enhanced Stability and Aerodynamic Performance of Skywalker X8 UAV via V-tail Integration.’ Accepted at the AIAA SCITECH 2025 Forum.

Journal Papers

1. **Manaa, Z.M.** and Qassem, N. (2024). ‘Novel Airfoil for Improved Supersonic Performance’ *The International Journal of Numerical Methods for Heat and Fluid Flow*.

Patents

1. Qassem, N. and **Manaa, Z.M.** (2024). Efficient Airfoil for Improved Supersonic Performance for Fighters, Patent ID. 550544US. Status: filed.

Preprints

1. **Manaa, Z.M.**, Abdallah, A.M. and Elferik, S. (2024). ‘KINETC: Koopman-Inspired Nonlinear Event Triggered Control from Data,’ submitted to *IEEE Access*.

Research Experience

Jan 2023 – present	KFUPM <i>Research Assistant – Flight Dynamics & Control and UAV Lab.</i> <ul style="list-style-type: none">○ Researching Koopman operator to globally linearize nonlinear dynamics.○ Exploring novel techniques for adaptive and model predictive control using new data-driven techniques.○ Developing data-driven event-triggered control frameworks.	Dhahran, Saudi Arabia
Jun 2022 – Aug 2022	National University of Science and Technology (NUST) <i>Research Intern – Aerial Robotics Lab</i> <ul style="list-style-type: none">○ Utilized hand gestures to control drones via built-in/web camera using YOLOvX detection models.○ Developed an autonomous control system for a quadrotor UAV using Tello and COEX clover devices with ROS.	Islamabad, Pakistan
Aug 2021 – Jul 2022	Egyptian Space Agency <i>Research Intern – Attitude Determination and Control Subsystem Lab.</i> <ul style="list-style-type: none">○ Conducted the bachelor’s thesis research under co-supervision of the Egyptian Space Agency and University of Science and Technology at Zewail City on spacecraft attitude determination and control subsystem.○ Developed the software of the attitude determination and control algorithm of a cube satellite which decreased the detumbling time of the cube satellite.	Cairo, Egypt

- Studied and implemented the space environment as a means of Earth's Magnetic Field (IGRF Model), Earth's gravitational field (using Spherical Harmonics) as well as modeling the space disturbances.

Teaching

Note: All the listed teaching experiences are affiliated with KFUPM.

Courses Taught

- AE 426 Undergrad. Course: Introduction to Flight Mechanics. (Fall 2023)
 AE 315 Undergrad. Lab: Systems and Control. (Fall 2023) - *Overall Evaluation: 9.56/10.0*

Teaching Assistantships

- AE 540 Graduate Course: Flight Dynamics and Control I. (Spring 2024)

Teaching-related Activities

- AE 350 – Monitored undergrad. Students' cooperative work in Aerospace Engineering and Control and
 CIE 350 Instrumentation Engineering Departments (Summer 2023)
 AE 399 – Oversaw undergrad. Students' summer internships workflow in Aerospace Engineering and
 CIE 399 Control and Instrumentation Engineering Departments (Summer 2023)

Presentations & Talks

- Mar 2024 **KIKX Seminar:** Data-driven techniques for modeling and control in aerospace applications. KFUPM. (~50 attendee)
 Jan 2024 **Talk:** Data-driven Discovery of The Quadrotor Equations of Motion Via Sparse Identification of Nonlinear Dynamics. AIAA. Florida, USA. Presented on behalf of the authors.
 May 2023 **Presentation:** On proper orthogonal decomposition and dynamic mode decomposition for aerodynamic application. KFUPM.
 Mar 2023 **Presentation:** Convex optimization for supersonic airfoil design using linear flow theory. KFUPM.

Fellowships & Awards

- 2023 **Mohammad Al-Aqeel Grant for Graduate Students:** Excellence Award for academic and research excellence, granted to attend AIAA 2023 SCITECH conference, Orlando, USA; awarded by Deanship of Research, KFUPM.
 2023 **Graduate International Research Assistance Scholarship:** Fully funded scholarship for a 2.5-year M.Sc. in Aerospace Engineering at KFUPM, Saudi Arabia.
 2022 **Research intern scholarship:** Awarded to distinguished international students to get a research internship at NUST.
 2022 **Future Work is Digital Scholarship:** Awarded for Egyptian students to study data science from the Ministry of Communications and Information Technology, Egypt.
 2019 **Smart City Hackathon:** 1st Place Award in global finals. Awarded by Digital Arabia Network, and Global Project, Germany.
 2017 **Undergraduate Fellowship:** Merit-based scholarship given to high school students to join the University of Science and Technology at Zewail City to cover five years of study in engineering and science programs to promote the scientific research.

Skills

- Programming Python (3 yrs.), MATLAB (4 yrs.), C++ (1.5 yrs.), and basic working flow with Julia
 Frameworks Pytorch, OpenCV, Sci-Kit, CVX
 Other skills GIT, SolidWorks, ANSYS, Mathematica, bash-scripting, Jupyter Notebook, L^AT_EX, and LabVIEW
 Languages Arabic (Mother Tongue), English (C1 user, IELTS: 7)

Professional Service

Reviewing

Conferences

- IEEE, SMILE 2024
 IEEE, eSmarTA 2024
 AIAA, SCITECH 2023 – 2024

Leadership

- 2020 **Euroavia, Zewail City, Egypt.**
 Managed a team of 10 people as the Media committee head for the Euroavia Egypt, student branch
 2019 **Science Festival, Zewail City, Egypt.**
 Managed a team of 15 people as the Media committee head for the Zewail City Science Festival mega event, Egypt.