

# Zeyad M. Manaa

Department of Mechanical Engineering,

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LinkedIn, GitHub, Scholar

<https://zmanaa.github.io/>

Last update: January 14, 2026

## EDUCATION

**Eindhoven University of Technology (TU/e)** May 2025 - May 2029; Eindhoven, NL

*PhD. in Mechanical Engineering, Dynamics and Control Group*

**King Fahd University for Petroleum & Minerals (KFUPM)** January 2023 – December

2024; Dhahran, SA

*M.Sc. in Aerospace Engineering<sup>1</sup>*

*Thesis<sup>2</sup>:* "Data-driven Approaches for Modeling and Control in Flight Dynamics Applications – On Linear and Nonlinear Methods"

**University of Science and Technology at Zewail City (UST-ZC)** September 2017 - May

2022; Giza, EG

*B.S. in Aerospace Engineering*

*Thesis:* "Development of the software package for the attitude determination and control algorithm of a cube satellite"

## INTERESTS

Data-driven modeling and control of dynamical systems and system identification – Non-linear and optimal control theory for flight dynamics – Event-triggered control – Secure control

## REFERRED PUBLICATIONS

### Journal Papers

- [1] Novel Airfoil for Improved Supersonic Performance with Convex Optimization Approach.  **Zeyad M. Manaa**, Naef A. A. Qassem  
*The International Journal of Numerical Methods for Heat and Fluid Flow*, 2024

### Conference Proceedings

- [2] Data-driven Discovery of The Quadrotor Equations of Motion Via Sparse Identification of Nonlinear Dynamics.  **Zeyad M. Manaa**, Mohamed R. Elbalshy, Ayman M. Abdallah  
*AIAA SCITECH 2024 Forum*, AIAA (p. 1308)
- [3] Koopman-LQR Controller for Quadrotor UAVs from Data.  **Zeyad M. Manaa**, Ayman M. Abdallah, Mohamed A. Abido, Syed S. A. Ali  
*IEEE SM 2024*
- [4] Optimum Configuration for Hovering N-Quadrotors Carrying a Slung Payload.  Mohssen M., Pansy Elkhodary, Meral Badr, Mohammed Sayegh, **Zeyad M. Manaa**, Ayman M. Abdallah  
*AIAA SCITECH 2025 Forum*
- [5] Design and Analysis of the Effect of Trimmable Vertical Stabilizers for Enhanced Aircraft Maneuverability and Directional Stability.  Shaik Zaidaan, Najwa Z. B. Taufik, Eman Mahmoud, **Zeyad M. Manaa**, Ayman M. Abdallah, Ghulam Abro, Mohd Taib  
*IEEE Conference on Systems, Process, and Control (ICSPC) 2024*
- [6] SINDy-CBF: Data-Driven Identification and Safe Control of Planar Quadrotor.  Mohamed R. Elbalshy, **Zeyad M. Manaa**, Ayman M. Abdallah, Md Ismail  
*International Conference on Control, Automation and Diagnosis (ICCAD), 2025*.

<sup>1</sup>Received the Outstanding Graduate Student Award for introducing a new research direction for the Aerospace Engineering Department and the Interdisc. Res. Ctr. for Aviation & Space Expl.

<sup>2</sup>This work is conducted with the Interdisc. Res. Ctr. for Aviation & Space Expl. under research grant INAE 2401. For outcomes see e.g., [2, 3, 6, and 7].

PREPRINTS	[7] Koopman-Based Event-Triggered Control from Data. <b>Zeyad M. Manaa</b> , Ayman M. Abdallah, Mohamed Ismail, Sami El-Ferik Submitted to journal.
	[8] Evaluation of Deep Learning-based Quadrotor UAV Detection and Tracking Methods. Mohssen E. Elshaar*, <b>Zeyad M. Manaa*</b> , Mohammed R. Elbalshy*, Abdul Jabbar Siddiqui, abd Ayman M. Abdallah Submitted to journal
PATENTS	[9] Airfoil for an aircraft for superior supersonic aerodynamic performance. Naef A. A. Qassem, <b>Zeyad M. Manaa</b> U.S. Patent No. 12358606. July 15, 2025
RESEARCH EXPERIENCE	<p><b>Interdiscip. Res. Cent. for Aviation &amp; Space Explor.</b> Jan 2025 – May 2025; Dhahran, SA  <i>Research Assistant</i> <ul style="list-style-type: none"> <li>Developing algorithms for anti-drone systems using GNC inspired swarm methods.</li> </ul> </p> <p><b>KFUPM, Space and Aviation Electronics Lab</b> Jan 2023 – Dec 2023; Dhahran, SA  <i>Research Assistant</i> <ul style="list-style-type: none"> <li>Researching Koopman operator to globally linearize nonlinear dynamics</li> <li>Developing data-driven event-triggered control frameworks</li> </ul> </p> <p><b>NUST, Aerial Robotics Lab</b> Jun 2022 – Aug 2022; Islamabad, Pak.  <i>Research Intern</i> <ul style="list-style-type: none"> <li>Developed an autonomous control system for a quadrotor UAV using Tello and COEX Clover devices with ROS</li> </ul> </p> <p><b>Egyptian Space Agency, ADCS Lab</b> Aug 2021 – Jul 2022; Cairo, EG  <i>Research Intern</i> <ul style="list-style-type: none"> <li>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</li> <li>Developed the software of the attitude determination and control algorithm of a cube satellite which decreased the detumbling time of the cube satellite</li> <li>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</li> </ul> </p>
INTERNSHIPS	<p><b>EgyptAir Maintenance and Engineering</b> Jun. 2022 – Aug. 2022; Cairo, Egypt  <i>Maintenance Engineering Intern [hands-off]</i></p> <p><b>Cairo University</b> Aug. 2021 – Jul. 2022; Cairo, Egypt  <i>Undergraduate Visiting Student – Space Systems Technology Laboratory</i></p>
TEACHING	<p><b>King Fahd University of Petroleum &amp; Minerals (KFUPM)</b></p> <ul style="list-style-type: none"> <li><b>Courses Taught</b> <ul style="list-style-type: none"> <li>AE 426; Fall 2023: Introduction to Flight Mechanics (Undergraduate Course)</li> <li>AE 315; Fall 2023: Systems and Control (Undergraduate Lab); overall evaluation: <b>9.56/10.0</b></li> </ul> </li> <li><b>Teaching Assistant</b> <ul style="list-style-type: none"> <li>AE 540; Spring 2024, Spring 2025: Flight Dynamics and Control I (Graduate Course)</li> </ul> </li> <li><b>Other Teaching-Related Activities</b> <ul style="list-style-type: none"> <li>AE 350 – CIE 350; Summer 2023: Monitored undergraduate students' cooperative work in Aerospace Engineering and Control &amp; Instrumentation Engineering Departments</li> <li>AE 399 – CIE 399; Summer 2023: Oversaw undergraduate students' summer internships workflow in Aerospace Engineering and Control &amp; Instrumentation Engineering Departments</li> </ul> </li> </ul>

## Eindhoven University of Technology (TU/e)

### • Teaching Assistant

- 4DM80; 2025: Fault Detection and Isolation for Control Systems

SUPERVISED STUDENTS	<b>Bhagat, Kavan Tapan</b> - Bachelor's Student, 2025 <b>Kathirchelvan, Tharmegan</b> - Bachelor's Student, 2025	TU/e TU/e
TALKS	<b>Koopman Meets LQR for Quadcopters using Data</b> Host: IEEE @ OntarioTech. <b>Data-driven Modeling and Control in Aerospace Applications</b> Mar. 2024; Dhahran, KSA Host: KIKX @ KFUPM. <b>Data-driven Discovery of Quadrotors Equations of Motion Via SINDy</b> Jan. 2024; FL, USA Host: AIAA <b>On POD and DMD for aerodynamics application</b> Host: Aerospace Department, KFUPM. <b>Convex optimization for thin airfoil design using linear flow theory</b> Mar. 2023; Dhahran, KSA Host: Aerospace Department, KFUPM.	Sep. 2024; Ontario, Canada May 2023; Dhahran, KSA Mar. 2023; Dhahran, KSA
AWARDS	<b>Outstanding Graduate Student Award</b> Interdisc. Res. Ctr. for Aviation & Space Expl., 2025 <b>Mohammad Al-Aqeel Grant for Graduate Students</b> KFUPM, 2023 <b>Graduate Intl. Research Assistance Scholarship</b> KFUPM, 2023 <b>Research Intern Scholarship for Intl. Students</b> NUST, 2022 <b>Future Work is Digital Scholarship</b> Ministry of Comm. and Info. Tech., 2022 <b>Smart City Hackathon: 1st Place Award in global finals</b> DAN & Global Project Partners, 2019 <b>Undergraduate Fellowship</b> UST-ZC, 2017	
SKILLS	<b>Programming:</b> Python ( <i>Advanced</i> ), MATLAB ( <i>Advanced</i> ), C++ ( <i>Intermediate</i> ), Julia ( <i>Basic</i> ) <b>Hardware:</b> Quanser 3DOF hover system, CUAV autopilots, Raspberry Pi, Pixhawk <b>Frameworks:</b> Pytorch, OpenCV, Sci-Kit, cvx/cvxpyp, ArduPilot (Multi-copter), ROS <b>Other skills:</b> GIT, SolidWorks, ANSYS, Mathematica, bash-scripting, L <sup>A</sup> T <sub>E</sub> X <b>Languages:</b> Arabic (Native), English (C1, IELTS: 7 [test date: Dec, 2021])	
SERVICES	<b>Reviewer:</b> Conferences: IEEE ACC 2025, IEEE SMILE 2024, IEEE eSmarTA, 2024 - 2025, AIAA SCITECH, 2024 – 2025	
LEADERSHIP EXPERIENCE	<b>Media Committee Head, Euroavia Zewail City</b> Managed a team of 10 people for the Euroavia Egypt student branch <b>Media Committee Head, Zewail City Science Festival</b> Managed a team of 15 people for the Zewail City Science Festival mega event	Egypt, 2020 Egypt, 2019