

# Zeyad M. Manaa

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- Education      **King Fahd University for Petroleum & Minerals (KFUPM)** Jan. 2023 – present; Saudi Arabia  
Dhahran, Saudi Arabia  
*M.Sc. in Aerospace Engineering (Cum Laude)*  
*Thesis*<sup>1</sup>: “Data-driven Approaches for Modeling and Control in Flight Dynamics Applications”
- University of Science and Technology at Zewail City (UST-ZC)** Sep. 2017 - May. 2022; Egypt  
Giza, Egypt  
*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 – Nonlinear and optimal control theory for flight dynamics – Event-triggered control
- Refereed 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 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  
*Accepted at AIAA SCITECH 2025 Forum*
- [5] Dynamic Stability Performance Analysis of The BWB Skywalker X-8  
Taha Najam, Anafi Sheriffdeen Olayinka, Abdul Motayib, Moses James Kehinde, **Zeyad M. Manaa**, Syed S. A. Ali, Ayman M. Abdallah  
*Accepted at AIAA SCITECH 2025 Forum*
- [6] Design and Analysis of the Effect of Trimmable Vertical Stabilizers for Enhanced Aircraft Maneuverability and Directional Stability  
Shaik Zaidan, Najwa Z. B. Taufik, Eman Mahmoud, **Zeyad M. Manaa**, Ayman M. Abdallah, Ghulam Abro, Mohd Taib  
*Accepted at the IEEE Conference on Systems, Process, and Control (ICSPC) 2024*
- Preprints      [7] [KOETC: Koopman Operator-Based Event-Triggered Control from Data](#)  
**Zeyad M. Manaa**, Ayman M. Abdallah, Mohamed Ismail, Sami El-Ferik  
*Submitted to Results in Engineering*
- [8] [Evaluation of Deep Learning-based Quadrotor UAV Detection and Tracking Methods](#)

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<sup>1</sup>This work is conducted with the Interdisciplinary Research Center for Aviation & Space Exploration under research grant INAE 2401. For outcomes see e.g., [2, 3, 7].

Mohssen E. Elshaar\*, **Zeyad M. Manaa\***, Mohammed R. Elbalshy\*, Abdul Jabbar Siddiqui, abd Ayman M. Abdallah  
*Submitted to Results in Engineering*

Patents	[9] Efficient Airfoil for Improved Supersonic Performance for Fighters Naef A. A. Qassem, <b>Zeyad M. Manaa</b> <i>Patent ID: 550544US. Status: filed</i>
Research experience	<b>KFUPM, Space and Aviation Electronics Lab</b> <i>Jan 2023 – Present; Dhahran, Saudi Arabia</i> <i>Research Assistant</i> <ul style="list-style-type: none"><li>• Researching Koopman operator to globally linearize nonlinear dynamics</li><li>• Exploring novel techniques for adaptive and model predictive control using new data-driven techniques</li><li>• Developing data-driven event-triggered control frameworks</li></ul> <b>NUST, Aerial Robotics Lab</b> <i>Jun 2022 – Aug 2022; Islamabad, Pakistan</i> <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> <b>Egyptian Space Agency, ADCS Lab</b> <i>Aug 2021 – Jul 2022; Cairo, Egypt</i> <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>
Internships	<b>EgyptAir Maintenance and Engineering</b> <i>Jun. 2022 – Aug. 2022; Cairo, Egypt</i> <i>Aircraft Maintenance Intern</i> <b>Cairo University</b> <i>Aug. 2021 – Jul. 2022; Cairo, Egypt</i> <i>Undergraduate Visiting Student – Space Systems Technology Laboratory</i>
Teaching	<b>Courses Taught</b>  [1] <b>AE 426</b> ; Fall 2023: Introduction to Flight Mechanics (Undergraduate Course)  [2] <b>AE 315</b> ; Fall 2023: Systems and Control (Undergraduate Lab); overall evaluation: <b>9.56/10.0</b>  <b>Teaching Assistantships</b>  [3] <b>AE 540</b> ; Spring 2024: Flight Dynamics and Control I (Graduate Course)  <b>Teaching-related Activities</b>  [4] <b>AE 350 – CIE 350</b> ; Summer 2023: Monitored undergraduate students' cooperative work in Aerospace Engineering and Control & Instrumentation Engineering Departments  [5] <b>AE 399 – CIE 399</b> ; Summer 2023: Oversaw undergraduate students' summer internships workflow in Aerospace Engineering and Control & Instrumentation Engineering Departments
Talks	<b>Koopman Meets LQR for Quadcopters using Data</b> <i>Sep. 2024; Ontario, Canada</i> Host: IEEE @ OntarioTech.  <b>Data-driven Modeling and Control in Aerospace Applications</b> <i>Mar. 2024; Dhahran, KSA</i> Host: KIKX @ KFUPM. (Approximately 50 attendees).  <b>Data-driven Discovery of Quadrotors Equations of Motion Via SINDy</b> <i>Jan. 2024; FL, USA</i> Host: AIAA  <b>On POD and DMD for aerodynamics application</b> <i>May 2023; Dhahran, KSA</i> Host: Aerospace Department, KFUPM.

**Convex optimization for thin airfoil design using linear flow theory** *Mar. 2023; Dhahran, KSA*  
Host: Aerospace Department, KFUPM.

Awards	<b>Mohammad Al-Aqeel Grant for Graduate Students</b>	<i>KFUPM, 2023</i>
	<b>Graduate Intl. Research Assistance Scholarship</b>	<i>KFUPM, 2023</i>
	<b>Research Intern Scholarship for Intl. Students</b>	<i>NUST, 2022</i>
	<b>Future Work is Digital Scholarship</b>	<i>Ministry of Comm. and Info. Tech., 2022</i>
	<b>Smart City Hackathon: 1st Place Award in global finals</b>	<i>DAN &amp; Global Project Partners, 2019</i>
	<b>Undergraduate Fellowship</b>	<i>UST-ZC, 2017</i>
Skills	<b>Programming:</b> Python (3 yrs.), MATLAB (4 yrs.), C++ (1.5 yrs.), Julia (basic)	
	<b>Hardware:</b> Quanser 3DOF hover system, CUAV autopilots, Raspberry Pi, Pixhawk	
	<b>Frameworks:</b> Pytorch, OpenCV, Sci-Kit, cvx/cvxpy, ArduPilot (Multi-copter), ROS	
	<b>Other skills:</b> GIT, SolidWorks, ANSYS, Mathematica, bash-scripting, $\LaTeX$	
	<b>Languages:</b> Arabic (Native), English (C1, IELTS: 7)	
Services	<b>Conference Reviewer:</b> IEEE SMILE 2024, IEEE eSmarTA, 2024, AIAA SCITECH, 2023 – 2024	
Leadership experience	<b>Media Committee Head, Euroavia Zewail City</b>	<i>Egypt, 2020</i>
	Managed a team of 10 people for the Euroavia Egypt student branch	
	<b>Media Committee Head, Zewail City Science Festival</b>	<i>Egypt, 2019</i>
	Managed a team of 15 people for the Zewail City Science Festival mega event	