Zeyad M. Manaa

Department of Mechanical Engineering,
Eindhoven University of Technology, Pendulum 2.21, Groene Loper 3, 5612 AE Eindhoven, The Netherlands
LinkedIn, GitHub, Scholar
https://zmanaa.github.io/

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Education

Eindhoven University of Technology *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[1]
Thesis[2]:"Data-driven Approaches for Modeling an 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 – Nonlinear and optimal control theory for flight dynamics – Event-triggered control – Secure 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 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 Payloa.d
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), 20255.

[1] Recieved 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.

[2] 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.
Zeyad M. Manaa, 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*, **Zeyad M. Manaa***, 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, **Zeyad M. Manaa**
U.S. Patent No. 12358606. July 15, 2025

Research experience

Interdiscip. Res. Cent. for Aviation & Space Explor. *Jan 2025 – May 2025; Dhahran, SA*
Research Assistant
- Developing algorithms for antil-drone systems using GNC inspired swarm methods.

KFUPM, Space and Aviation Electronics Lab *Jan 2023 – Dec 2023; Dhahran, SA*
Research Assistant
- Researching Koopman operator to globally linearize nonlinear dynamics
- Developing data-driven event-triggered control frameworks

NUST, Aerial Robotics Lab *Jun 2022 – Aug 2022; Islamabad, Pak.*
Research Intern
- Developed an autonomous control system for a quadrotor UAV using Tello and COEX Clover devices with ROS

Egyptian Space Agency, ADCS Lab *Aug 2021 – Jul 2022; Cairo, EG*
Research Intern
- 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
- 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

Internships

EgyptAir Maintenance and Engineering *Jun. 2022 – Aug. 2022; Cairo, Egypt*
Maintenance Engineering Intern [hands-off]

Cairo University *Aug. 2021 – Jul. 2022; Cairo, Egypt*
Undergraduate Visiting Student – Space Systems Technology Laboratory

Teaching

King Fahd University of Petroleum & Minerals (KFUPM)

- **Courses Taught**
  - AE 426; Fall 2023: Introduction to Flight Mechanics (Undergraduate Course)
  - AE 315; Fall 2023: Systems and Control (Undergraduate Lab); overall evaluation: **9.56**/10.0
- **Teaching Assistant**
  - AE 540; Spring 2024, Spring 2025: Flight Dynamics and Control I (Graduate Course)
- **Other Teaching-Related Activities**
  - AE 350 – CIE 350; Summer 2023: Monitored undergraduate students' cooperative work in Aerospace Engineering and Control & Instrumentation Engineering Departments
  - AE 399 – CIE 399; Summer 2023: Oversaw undergraduate students' summer internships workflow in Aerospace Engineering and Control & Instrumentation Engineering Departments

Eindhoven University of Technology (TU/e)

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

Talks

Koopman Meets LQR for Quadcopters using Data *Sep. 2024; Ontario, Canada*
Host: IEEE @ OntarioTech.

Data-driven Modeling and Control in Aerospace Applications *Mar. 2024; Dhahran, KSA*
Host: KIKX @ KFUPM. (Approximately 50 attendees).

Data-driven Discovery of Quadrotors Equations of Motion Via SINDy *Jan. 2024; FL, USA*
Host: AIAA

On POD and DMD for aerodynamics application *May 2023; Dhahran, KSA*
Host: Aerospace Department, KFUPM.

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

Awards

Outstanding Graduate Student Award *Interdisc. Res. Ctr. for Aviation & Space Expl., 2025*
Mohammad Al-Aqeel Grant for Graduate Students *KFUPM, 2023*
Graduate Intl. Research Assistance Scholarship *KFUPM, 2023*
Research Intern Scholarship for Intl. Students *NUST, 2022*
Future Work is Digital Scholarship *Ministry of Comm. and Info. Tech., 2022*
Smart City Hackathon: 1st Place Award in global finals *DAN & Global Project Partners, 2019*
Undergraduate Fellowship *UST-ZC, 2017*

Skills

Programming: Python (*Advanced*), MATLAB (*Advanced*), C++ (*Intermediate*), Julia (*Basic*)
Hardware: Quanser 3DOF hover system, CUAV autopilots, Raspberry Pi, Pixhawk
Frameworks: Pytorch, OpenCV, Sci-Kit, cvx/cvxpy, ArduPilot (Multi-copter), ROS
Other skills: GIT, SolidWorks, ANSYS, Mathematica, bash-scripting, LaTeX
Languages: Arabic (Native), English (C1, IELTS: 7 [*test date: Dec, 2021*])

Services

Reviewer:
Conferences: IEEE SMILE 2024, IEEE eSmarTA, 2024 - 2025, AIAA SCITECH, 2024 – 2025
Journals: European Journal of Control, 2025.

Leadership experience

Media Committee Head, Euroavia Zewail City Egypt, 2020
Managed a team of 10 people for the Euroavia Egypt student branch
Media Committee Head, Zewail City Science Festival Egypt, 2019
Managed a team of 15 people for the Zewail City Science Festival mega event